95.3.8

TECHNICAL ASSISTANCE WORK PRODUCTS
N.H. COASTAL PROGRAM -- FY-1996

STRATHAM MASTER PLAN ASSISTANCE

1. **Natural Resources, Conservation and Preservation Chapter -- Final Draft**
2. **Recreation Chapter -- Final Draft**
3. **Transportation Chapter -- Final Draft**
4. **Housing Chapter -- Final Draft**
5. **Existing Land Use -- GIS Map**
6. **Master Plan Committee Support -- Documentation**

Assistance Provided by the
Rockingham Planning Commission
121 Water Street
Exeter NH 03833

October 1995 - September 1996

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NH Coastal Program

NOAA

STRATHAM MASTER PLAN

1. NATURAL RESOURCES, CONSERVATION AND PRESERVATION CHAPTER

NATURAL RESOURCES, CONSERVATION AND PRESERVATION SECTION
(Revision Date: August 28, 1996)

Chapter Outline

1. Introduction

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   - 2.4 water resources
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     - -- wetlands
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3. Water Resources Protection
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4. Open Space and Land Conservation
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1.0 INTRODUCTION

Stratham's natural environment is characterized by a rich legacy of forests, agricultural lands, rivers and streams, undeveloped shorelands and wetlands. Historically, these resources have provided Stratham with a high quality environment and contribute importantly to the high quality of life in the community. Although Stratham's natural features still exist in abundance, past development has inevitably resulted in the loss of some resources, especially open spaces and active agricultural lands. Careful attention must be given to future development so that further losses to both the natural and cultural environment are minimized and that the essential qualities that make Stratham the community it is remain intact.

This major section of the Master Plan will inventory the existing natural and built features of Stratham and examine existing conditions and future needs for protecting the Town's land, water and historic resources. In part, it will do so by integrating and updating information from several important planning documents prepared by the Town over the past decade, including the 1985 Stratham Master Plan, the Open Space and Recreation Plan (1989), the Water Resources Management and Protection Plan (1993), the Wellhead Protection Program Report (1993) and the Stratham Community Stewardship Project report (1996). The chapter concludes with general and specific recommendations regarding steps the community should take to protect and conserve the essential resources of the Town.

2.0 NATURAL RESOURCES INVENTORY

In order to determine the existing conditions and future needs of the town's resources, it is necessary to review the extensive inventory information that exists. The inventory will review information about the Town's geology, topography, soils, water resources, wildlife, agriculture lands, and forest lands. For the purpose of compliance with RSA 674:2 VIII-a, an inventory of potential construction materials (sand and gravel resources) is also included. Later sections of this chapter will include inventories of open space and conservation lands and of historic and archeological sites.

2.1 Geology

Bedrock Geology

The bedrock in Stratham, as in all of southeastern New Hampshire, was formed from layers of sea bottom sediments deposited and compacted over millions of years into formations of sedimentary rock. These formations were transformed through uplifting, folding, and tremendous heat and pressure into metamorphic rock. According to the "Geological Map of New Hampshire", prepared by the US Geological Survey and the NH State Geologist in 1986, there are two major bedrock types in Stratham: the *Eliot formation* running in a north/south direction through the central part of town and the *Kittery formation* running in bands along the

westerly and easterly boundaries. Two small inclusions of the *Exeter formation*, also metamorphic, are located east of Guinea Rd. and east of Hillcrest Drive. In addition to these metamorphic formations, small traces of an igneous formation are found on the Greenland border near where the Winniconic Brook leaves the Town. All of the types of bedrock found in Stratham have excellent bearing capacities and pose few, if any development constraints. A map included in the 1993 Stratham Water Resources and Management Plan (Map 4) shows the location of these formations within the Town.

Surficial Geology

The upper layers of geologic materials above the bedrock formations are known as surficial deposits, and largely determine the shape topography of the Town. In southeastern New Hampshire, these geologic materials were deposited by a glacier more than 10,000 years ago. Within Stratham, there are four types of surficial materials: till, contact deposits, marine deposits and outwash/shore deposits . These materials are described in more detail below.

Till-- As the mile thick glacier advanced from the northwest, it deposited layers of debris made of sand, silt, clay, and gravel, which is collectively known as *till*. Stratham's till areas, which make up roughly one-third of the Town's area, are found primarily on the hills and ridges of the central portion of Town. Till usually provides adequate loading capacity for building foundations, thus indicating that till areas are suited for general development purposes. However, if hardpan (an impermeable layer) is located within 18 to 24 inches below the surface, conditions may not be adequate for the placement of on-site septic systems.

Contact Deposits-- As the glacier melted and retreated, sediments were released forming layers of sand and gravel called ice contact deposits. These deposits have good drainage and permeability characteristics with a high water bearing capacity. These deposits, which include the Town's stratified drift aquifers, usually contain large quantities of groundwater, thus making them potentially suitable sources for public water supplies. A band of contact deposits crosses central Stratham from north to south, comprising about twenty percent of the town's total land area. These areas are also easily excavated and have historically been the location of sand and gravel pits.

Marine Silt and Clay Deposits -- These deposits resulted from marine deposition during the period when the ocean inundated most of southeastern New Hampshire. Marine deposits were formed along the bottom of the ancient sea as well as its bays and estuaries. As the sea level retreated to its present position, the marine deposits were left in what are now upland areas. Marine silt and clay deposits are the dominant feature Stratham' surficial geology, covering over sixty percent of the land area. These areas are found in the Town's low-lying areas along the Squamscott River and the drainage ways of Jewett Hill Brook, Mill Brook and Winniconic Brook. Generally, these materials are unsuitable or marginally suitable for development because of a high water table with poor drainage and unstable conditions. In some areas these limitations can be overcome with the provision of adequate drainage facilities and special engineering and design considerations.

Outwash and Shore Deposits -- The glacial melt waters carried away sands and fine gravels and deposited materials along the shorelines of ancient seas. A scattering of these deposits (10 per cent) is located along Route 108. Due to their good bearing capacity and moderate permeability, these materials are very suitable for development.

2.2 Topography and Slope

Stratham's terrain is predominately rolling with gentle slopes of 0-8 percent. The topography rises and falls from a low of slightly above mean sea level at the Squamscott River's edge to a high of 290 feet at Jewett Hill.

Map **RCP-1** ***Topography*** depicts the topography through elevation contour lines . Five hills above 200 feet elevation are located in Stratham, adding some variety to the landscape. Among these hills is the publicly owned Stratham Hill (noted for its scenic vistas of Great Bay) as well as Long Hill and Jewett Hill. Barker's Hill is also in this area. Bunker Hill and Rollins Hill form a crescent shaped ridge to the south. The summit of nearby Pine Hill is on the North Hampton border.

The valleys between the uplands consist of pockets of wetlands and small ponds and brooks on the eastern part of Town. To the west, the lowlands stretching to the river's edge are characterized by alluvial plains and tidal marshes. Due to the predominantly gentle terrain, there are relatively few areas in Stratham where steep slopes preclude development. Based on the NRCS (formerly SCS) Soil Survey conducted in 1979, the distribution of land area by slope class in Stratham is as follows:

Slope Class	Total Acres	% of Total
Gradual -- 0-8%	8476	92.4%
Steep -- 8-15%	439	5.0%
Steep -- 15-25%	128	1.4%
Severe -- 25+%	113	1.2%
Total	9155	100.0%

The vast majority of Stratham falls within the gradual slope class. Most of these areas are suitable in slope for all types of development, however, within the 0-3% areas (near the river and streams) some very flat areas are susceptible to flooding and/or are poorly drained -- both conditions indicating poor development suitability. A small portion (2.6%) of the total land area of Stratham has slopes of 15% or greater. These extremely steep areas, including sections of Jewett, Long and Rollins and Bunker Hill pose severe development constraints and should be avoided.

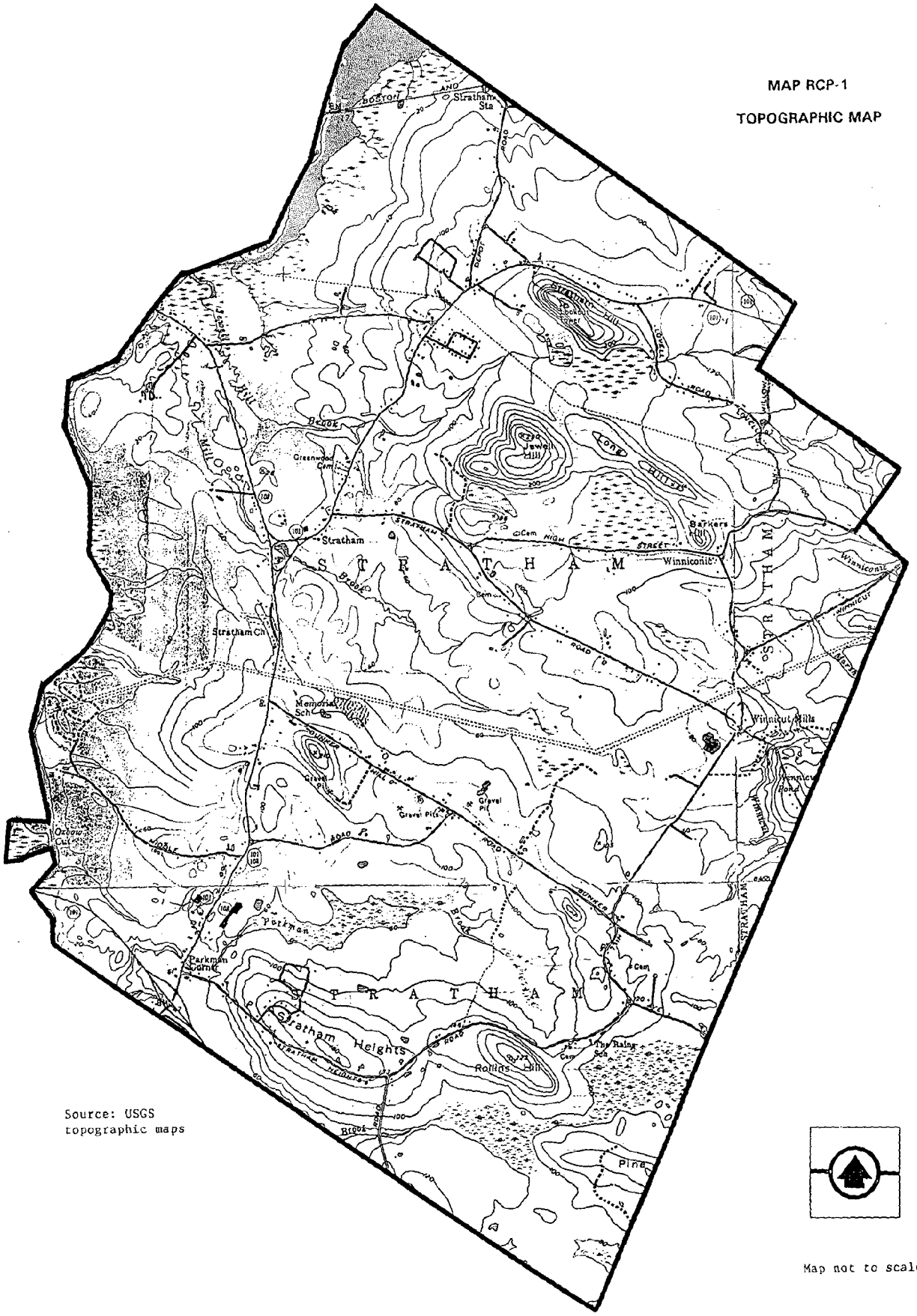
2.3 Soils

Soil information is critical in making sound land use decisions, particularly in Stratham where sewage disposal depends exclusively on the use of on-site septic systems. Knowledge regarding soil suitability can be used to direct development activity away from poorly suited areas and toward those with the capability to sustain it. For example, residential development should be located away from areas with unstable soil conditions, high

STRATHAM

MAP RCP-1

TOPOGRAPHIC MAP



Source: USGS
topographic maps

Map not to scale

water tables, and slow percolation rates due to constraints for building foundations and septic system placement. Other soils are better suited for agricultural uses because of level topography, good drainage and lack of stoniness.

As indicated above, a soil survey for the Town of Stratham was conducted by the Natural Resources Conservation Service , USDA (formerly SCS) in 1979. A report was also prepared which describes Stratham's soils and their limitations for various uses including dwellings, septic systems, agriculture, forestry mining and road construction. This report was updated in 1994. The current Soil Survey map for Rockingham County, which displays the soil type and slope classes for all mapped soil units in Stratham is available at the NRCS and Rockingham County Conservation District offices and is incorporated by reference to the Master Plan. Soil data is very useful as a planning guide for making generalized land use determinations, however, they are not suitable for site-specific evaluations due to limitations in scale and accuracy. Since the mid 1980s, the Town has been using High Intensity Soil mapping (HIS) whenever site specific information is required for zoning enforcement purposes.

Soil Potential for Development

Since the latter 1970's when soil limitation data became more widely used in planning, refinements in the technical interpretation of soil suitability have yielded an updated approach to soils rating. A new system, described in Soil Potentials for Development (RCCD, 1987) replaces "soil limitation" ratings with "soil potential ratings". The rating system classifies soils on the basis of the relative ease or difficulty of placing a septic system (particularly the absorption field) on a given soil/slope complex. The key difference between the two approaches is that soil potential takes into account common engineering design and construction techniques typically used to overcome soil limitations. Soil potential ratings are not recommendations for soil use; however, they do provide a more realistic approach in determining land use potential. The concept is recommended over previous approaches. It is particularly useful as a land use planning tool.

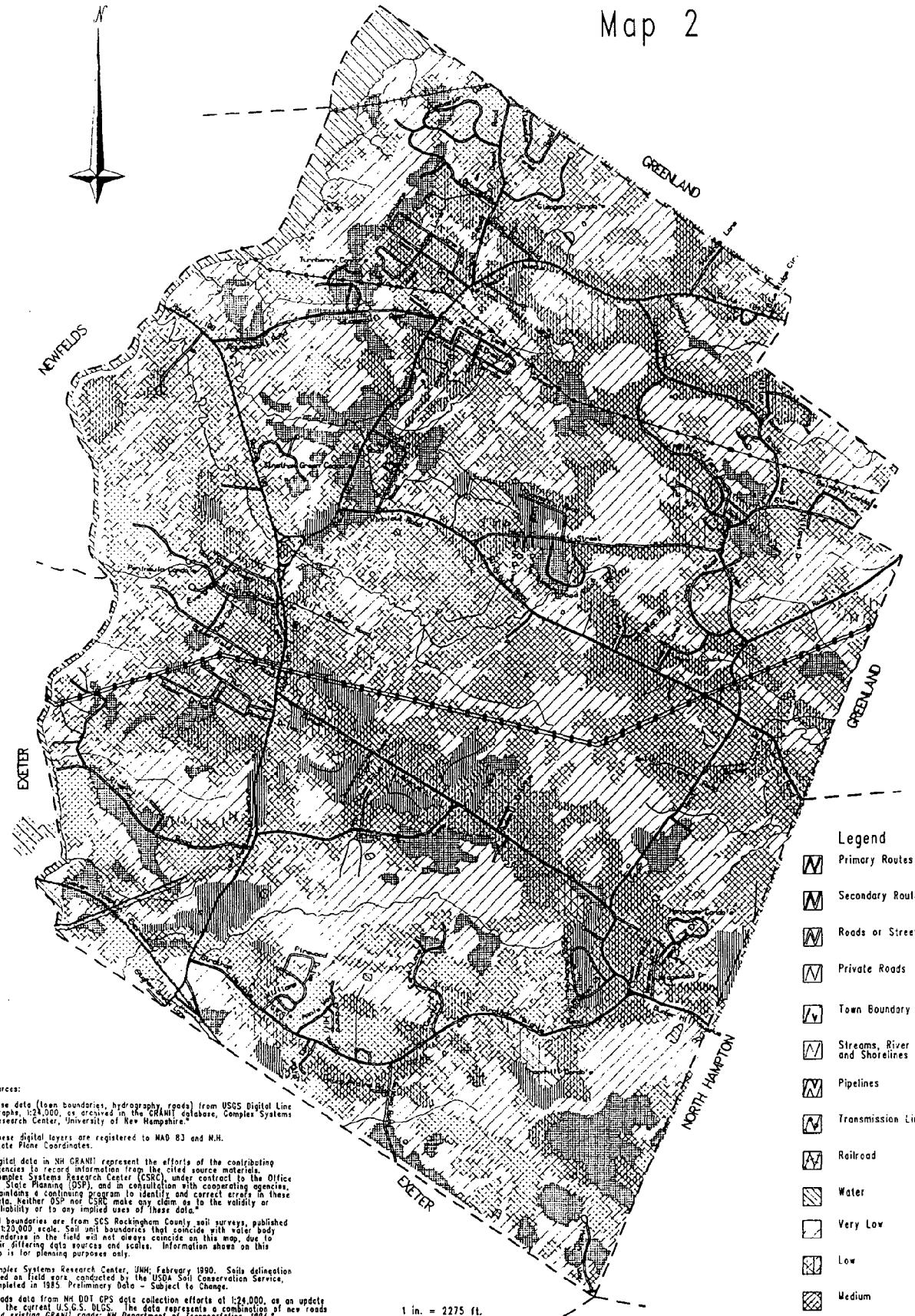
Table RCP- 2 illustrates the distribution of soils in Stratham by development potential. Less than 20% of the Town's land has a rating of either high or very high. Land rated medium accounts for 29.1% of the area and land rated low and very low accounts for 16.3% and 28.4% respectively.

In Stratham, where all properties except for those in the Industrial Zone are reliant on on-site wastewater disposal, a map based on soil potential ratings serves as an excellent general indicator of development suitability. **Map RCP-2** ***Soil Potential for Development*** provides a "first-cut" indication of the areas in Stratham where additional development can be best accommodated, assuming continued reliance on on-site septic systems.

2.4 Water Resources

This section of the Master Plan summarizes information contained in the 1993 report Water Resource Management and Protection Plan, Town of Stratham which is hereby incorporated by reference in its entirety.

Stratham, N.H.
Soils Potential for Development
Map 2



Legend

- Primary Routes
- Secondary Routes
- Roads or Streets
- Private Roads
- Town Boundary
- Streams, River bank and Shorelines
- Pipelines
- Transmission Lines
- Railroad
- Water
- Very Low
- Low
- Medium
- High
- Very High
- Not Rated

Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability of or to any implied uses of these data."

Soil boundaries are from SCS Rockingham County soil surveys, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

1 in. = 2275 ft.
Scale 1:27300

0 feet 2275 4550 6825

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by the Rockingham Planning Commission

That Plan addresses the requirements established by the New Hampshire Office of State Planning under the authority of RSA 4-C:20,I, for the preparation of local water resource management and protection plans. It is summarized here for continuity of the Master Plan and to update pertinent information.

SURFACE WATERS

Surface water systems are any type of water resource located above ground on the earth's surface. Examples of surface water systems include: streams, rivers, marshes, ponds, bogs, lakes, wetlands, etc. Surface water systems are more dynamic than groundwater, in that they are influenced by the effects of wind, rain, and temperature. They are also subject to varying rates of flow, such as the difference between the flow rate of a river as opposed to that of a pond.

Surface water resources function as holding areas for flood waters and seasonal high waters. In addition, they serve as recharge areas and discharge points for groundwater resources. The point of discharge is where the surface water and groundwater are hydrologically connected. Most commonly, surface water resources will act as a discharge point for groundwater. However, during the spring months surface waters help to recharge groundwater resources, which in turn replenish shallow domestic water wells. It should be noted that prolonged dry periods can result in an overall lowering of the water table.

2.4.1 Watersheds Within Stratham

The watershed is the principal focus in describing a surface water system. It is the land area within a series of connecting higher ridges that drain surface water to the lowest point, which is where a stream or river flows out of the watershed. The network formed by rivers, streams, lakes, and ponds is known as the drainage system of the watershed.

Stratham forms a portion of three regional watersheds: the Great Bay, the tidal Squamscott River, and the Coastal Watershed. The first two watersheds are part of the larger Piscataqua River Basin, while the Coastal Watershed is part of the larger Coastal River Basin. The accompanying **Map RCP-3** ***Watersheds and Surface Waters***, indicates the watershed divides located in Stratham.

In an effort to isolate meaningful drainage patterns in Stratham, two sub-watersheds were delineated. The first is the Dearborn Brook Sub-Watershed which forms a portion of the Squamscott River Watershed. The second is the Winnicut River Sub-Watershed which forms a portion of the Great Bay Watershed. The Watersheds and Surface Waters map (RCP-3) depicts the watershed divides within Stratham (both regional and sub-watersheds), plus the Town's perennial waterbodies and watercourses. For additional description of the watershed and sub-watersheds in Stratham, please refer to the *Water Resources Management and Protection Plan*.

2.4.2 Waterbodies in Stratham

There are eight significant waterbodies within Stratham: Mill Pond, the Winnicut Mill Pond, and six ponds which do not have names. The unnamed ponds are depicted on Map 2 as Ponds #1 through #6.

MAP RCP-3

Watersheds and Perennial Water Bodies
Map B

Watershed Boundary

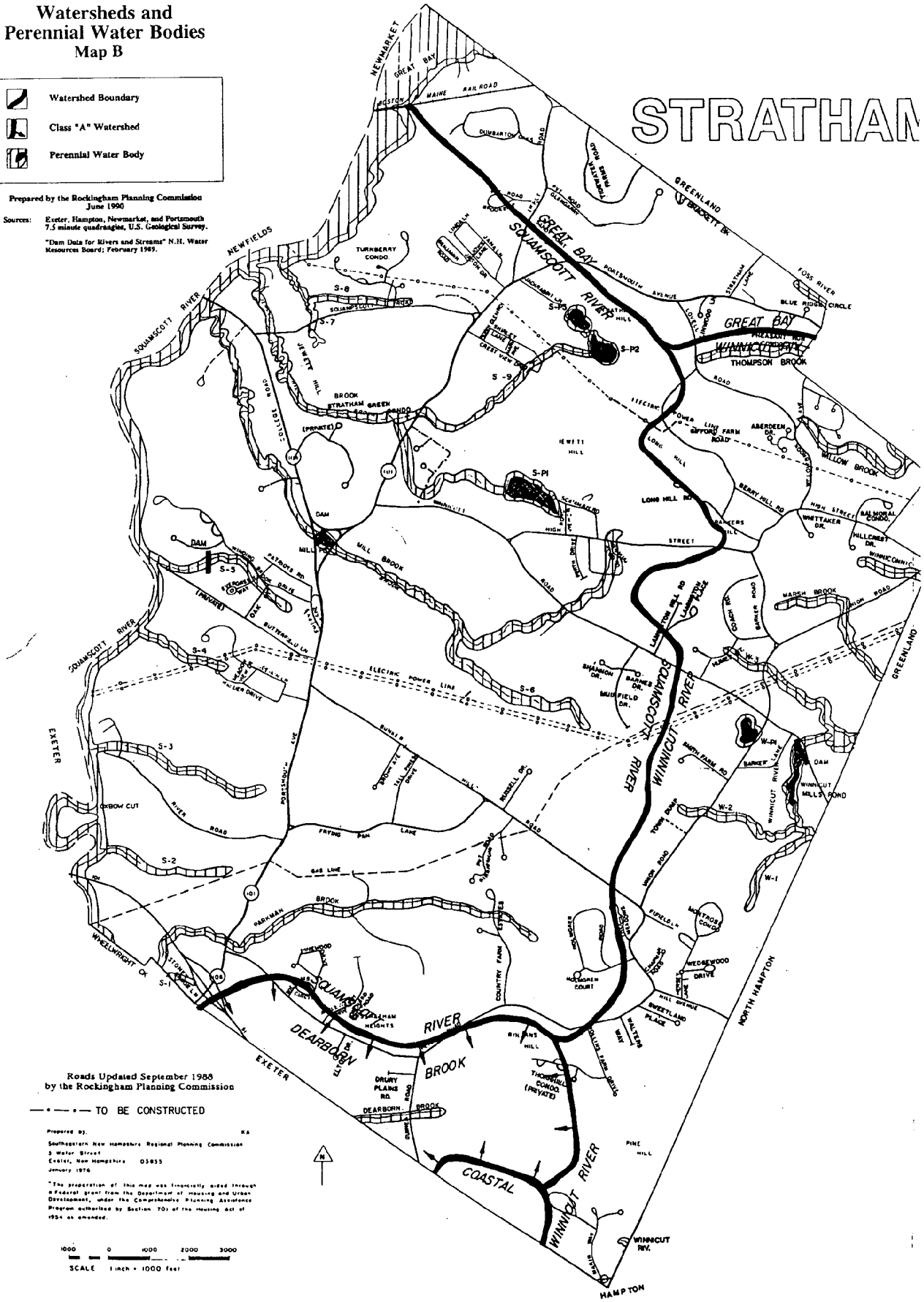
Class "A" Watershed

Perennial Water Body

Prepared by the Rockingham Planning Commission
June 1990

Sources: Exeter, Hampton, Newmarket, and Portsmouth 7.5 minute quadrangles, U.S. Geological Survey.

"Dam Data for Rivers and Streams" N.H. Water Resources Board; February 1969.



Roads Updated September 1988
by the Rockingham Planning Commission

— • — • — TO BE CONSTRUCTED

Prepared by: RA

Southeastern New Hampshire Regional Planning Commission
3 Water Street
Exeter, New Hampshire 03833
January 1976

"The preparation of this map was financially aided through a Federal grant from the Department of Housing and Urban Development, under the Comprehensive Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

1000 0 1000 2000 3000

SCALE 1 inch = 1000 feet

In addition, there are a number of tiny ponds (one acre or less) scattered throughout Town. The vital statistics of Stratham's significant waterbodies (including surface area, elevation, watershed location, and whether freeflowing or impounded) are presented in **Table RCP-3** below.

TABLE RCP - 3 - STRATHAM WATERBODIES

Waterbody	Surface Area (miles)	Elevation (feet)	Watershed Location	Impounded or Freeflowing
Mill Pond	3.0	30	Squamscott River	Impounded
Winnicut Mill	3.0	40	Great Bay	Impounded
Unnamed Pond #1	3.0	75	Great Bay	Impounded
Unnamed Pond #2	2.0	40	Great Bay	Freeflowing
Peat Pond (label unknown pond #3)	12.0	150	Squamscott River	Freeflowing
Unnamed Pond #4	6.0	150	Squamscott River	Freeflowing
Unnamed Pond #5	3.0	150	Squamscott River	Freeflowing
Unnamed Pond #6	2.0	45	Squamscott River	Freeflowing
Sources:	*United States Geological Survey (USGS) topographic maps, Water Resource Division (WRD) dam records, and RPC analysis.*			

In terms of perennial streams, Stratham contains 14 named streams and 11 unnamed streams for a total of 25 watercourses. The Town's watercourses are shown on Map 2. The unnamed streams are shown on the map as Unnamed Streams A through K. The vital statistics of the Town's perennial streams are presented in **Table RCP-4** below.

TABLE RCP - 4 - STRATHAM WATERCOURSES

Watercourse	Length (miles)	Elevation (feet)	Watershed Location	Impounded or Freeflowing
Squamscott River	5.2	10	Squamscott River	Freeflowing
Winnicut River	1.0	70	Winnicut River	Impounded
Foss Brook	0.2	70	Great Bay	Freeflowing
Jewell Hill Brook	2.2	150	Squamscott River	Freeflowing
Wheelwright Creek	0.1	10	Squamscott River	Freeflowing
Mill Brook	3.6	130	Squamscott River	Impounded
Parkman Brook	2.2	90	Squamscott River	Freeflowing

Watercourse	Length (miles)	Elevation (feet)	Watershed Location	Impounded or Freeflowing
Dearborn Brook	0.5	90	Dearborn Brook	Impounded
Winding Brook	0.9	80	Squamscott River	Impounded
Thompson Brook	0.6	160	Winnicut River	Freeflowing
Willow Brook	0.7	90	Winnicut River	Freeflowing
Winniconic Brook	0.4	35	Winnicut River	Freeflowing
Marsh Brook	0.8	60	Winnicut River	Freeflowing
Brackett Brook	0.1	90	Great Bay	Freeflowing
Stream A	0.3	50	Squamscott River	Freeflowing
Stream B	0.9	60	Squamscott River	Freeflowing
Stream C	0.9	40	Squamscott River	Freeflowing
Stream D	0.5	40	Squamscott River	Freeflowing
Stream E	1.0	70	Squamscott River	Freeflowing
Stream F	0.5	20	Squamscott River	Freeflowing
Stream G	0.5	40	Squamscott River	Freeflowing
Stream H	1.1	150	Squamscott River	Freeflowing
Stream I	0.8	75	Winnicut River	Freeflowing
Stream J	0.7	55	Winnicut River	Freeflowing
Stream K	0.6	70	Winnicut River	Freeflowing
Sources: USGS topographic maps, WRD dam records, and RPC analysis.				

2.4.3 Surface Water Quality

In New Hampshire, each surface waterbody and watercourse has been given a legislative water quality classification of A, B, or C, as identified in RSA 149:3. The classifications are defined below.

- *Class A Waters* - Of the highest quality and potentially acceptable as public water supply sources after disinfection. No sewage or wastes shall be discharged into these waters.

- *Class B Waters* - Of the second highest quality and no objectionable physical characteristics. No sewage or waste shall be discharged into these waters unless they have been adequately treated. Acceptable for bathing and other recreational purposes and, after treatment, for use as public water supplies.

- *Class C Waters* - Acceptable for boating, fishing, or for industrial water supply, either with or without treatment. These waters cannot be used as a public water supply source.

Currently, all of Stratham's surface water resources have received Class B status from the New Hampshire State legislature. The only exception is the Dearborn Brook Sub-Watershed which is considered a Class A water source due to the use of the Exeter Reservoir as a municipal water supply source for Exeter. It should be noted that legislative classification does not mean that the water always meets this established standard.

Although Stratham does not actively monitor the quality of its surface waters, there are several organizations involved in monitoring the Squamscott River and its tributaries. These organizations and their efforts are described below.

1. Municipal Monitoring: The Exeter Public Works Department conducts daily water quality monitoring efforts at the municipal wastewater treatment plant's point of discharge along the Squamscott River. The Department also conducts toxicity tests on a quarterly basis. As mentioned previously, the river is a tributary to the Great Bay. All of the bay's tributaries are currently closed to shell-fish harvesting because of the problems associated with improperly treated sewage. Exeter has recently upgraded its sewer system and treatment plant to separate stormwater from wastewater. Prior to the project's completion, storm events would often overflow the Town's sewage lagoons, thus resulting in untreated sewage being discharged into the river. It is expected that the stormwater separation project will eventually enhance the river's water quality as well as the bay's.

2. 305(b) Water Quality Report: A comprehensive source of regional water quality information can be found in the 1992 publication NH Water Quality Report to Congress 305 (b), prepared by the Water Supply and Pollution Control Division of the NH Department of Environmental Services. The report describes broad water quality parameters for the major river basins in the State, including the Piscataqua and Coastal basins. The report identifies surface waters which do not meet the standards for their legislative classification.

   Within Stratham, only the Squamscott River was designated as "not supporting" its Class B rating; the reason being high bacteria counts. Water quality sampling conducted in the Exeter and Squamscott Rivers in 1995 have revealed high levels of Fecal and E. coli bacteria which exceed Class B standards. The Squamacott River closest to Stratham -- at the mouth of Cobby Brook in Newfields-- showed the mean *E. coli* level over five samples to be 255 cts/100ml -- about twice the Class B state limit of 126 cts/100ml (*Source: NH Office of State Planning, NH Coastal Program, 1995).* According to an agreement between the NH Department of Environmental Services and the Division of Public Health Services, the Squamscott River will not be deemed as supporting its Class B designation until all of the shellfish beds are open to harvesting on a regular basis. Currently, only a few of the beds within the Great Bay proper are open to the taking of shellfish. It is hoped that the recent upgrade of Exeter's treatment plant and an increase in water sampling by the State will result

in re-opening Great Bay to shellfish harvesting.

3. Great Bay National Estuarine Research Reserve: The entirety of the Squamscott River falls within the Great Bay National Estuarine Research Reserve which was designated by the United States Congress in 1989 as the nation's 18th National Estuarine Research Reserve under the federal Coastal Zone Management Act (CZMA). The CZMA created a federal-state partnership for the protection and management of coastal areas. New Hampshire's Coastal Program is administered by the NH Office of State Planning.

   The Great Bay Reserve includes over 4,400 acres of tidal water areas representing the range of different environments around the estuary (saltmarsh areas, bluffs, rocky shores, woodlands, open fields, etc.). While the highest priority of the Reserve is to preserve the bay through an aggressive land acquisition program, there is also a strong emphasis on using the reserve for long-term research and education.

4. Great Bay Hydrologic Unit: This is a project sponsored by the US Department of Agriculture, and involves the following organizations: The Rockingham and Strafford County Conservation Districts, the Rockingham and Strafford County branches of the Soil Conservation Service (SCS), the Agricultural Conservation and Stabilization Services (ASCS), the UNH Cooperative Extension Service and the US Geological Survey. The project provides non-point pollution source education to the public for the watershed area covering the Great Bay. The education effort is geared towards providing best management education materials for potentially hazardous land uses.

2.4.4 Wetlands

Stratham's Zoning Ordinance defines the Town's Wetlands Conservation District as follows: "Those areas of the Town that contain marshes, ponds, bogs, lakes, as well as soils that are defined as poorly or very poorly drained as defined by the National Cooperative Soil Survey conducted by the USDA Soil Conservation Service." The district also includes "the borders of tidal marshes of the Squamscott River and Great Bay. Said borders are hereby defined as those areas adjacent to the Squamscott River and Great Bay with elevations of eight (8) feet or less above mean sea level."

The Town's Subdivision Regulations and Site Plan Review Regulations further refine the district to include those areas consisting of poorly drained and very poorly drained soils as delineated through High Intensity Soil Surveys (HISS) prepared by a licensed soil scientist. In most cases, new development proposals must include HISS data as part of the application for regulatory review.

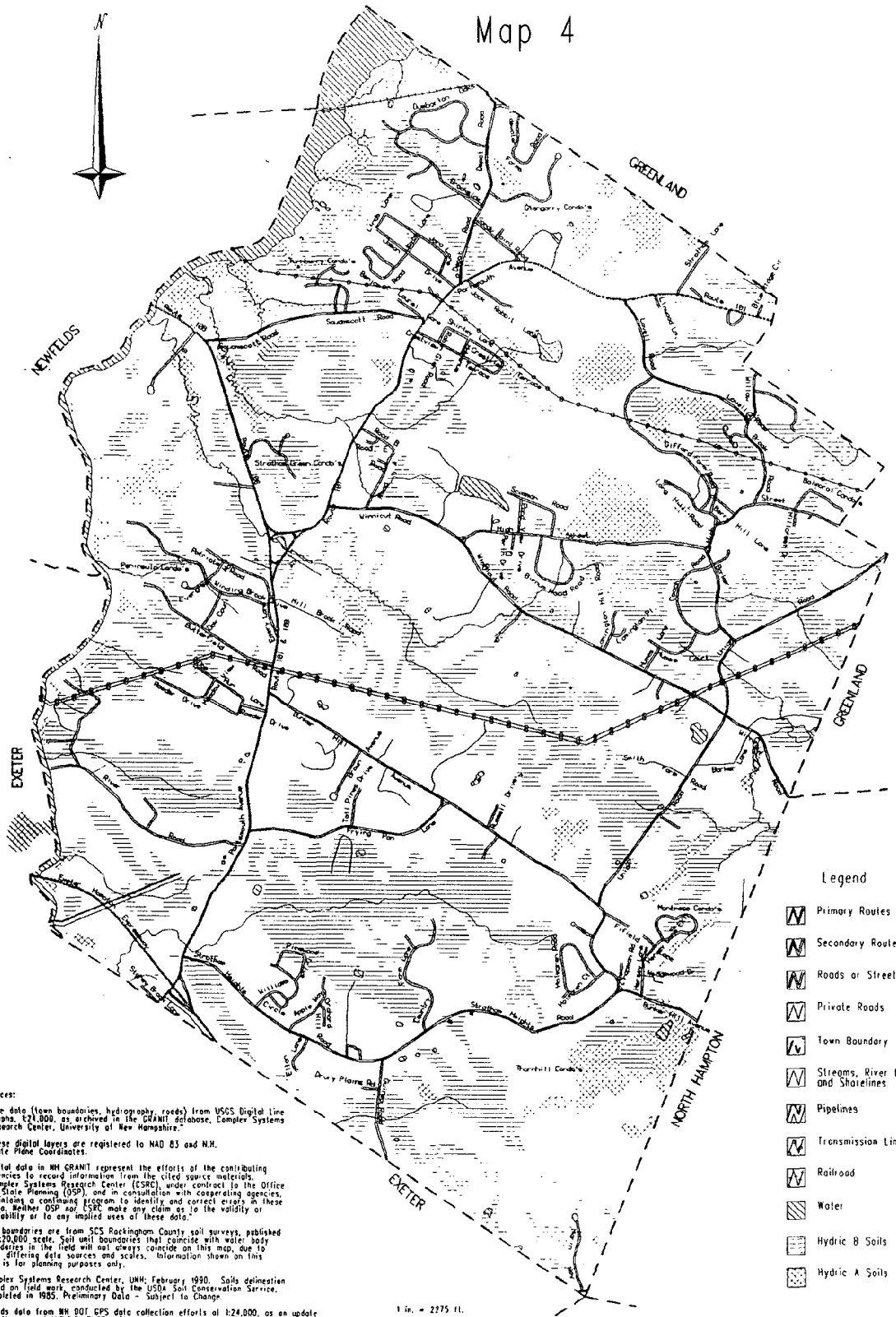
The Town's Wetland Map is included in this document as **Map RCP-4**. The map is taken from the GRANIT soils data coverage and is based on a digitized version of the Soil Survey of Rockingham County, New Hampshire (NRCS).

Table RCP-5 below shows the number of acres of wetland soils within the three regional watersheds.

Stratham, N.H.

Wetlands

Map 4



Sources:

...e data (town boundaries, hydrography, roads) from USGS Digital Line ...aphs, 1:24,000, as archived in the GRANIT database, Complex Systems ...esearch Center, University of New Hampshire."

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NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by the Rockingham Planning Commission
August 9, 1996

The table indicates that Stratham contains roughly 3,342 acres of wetlands. This accounts for roughly 36% of the Town's total land area.

TABLE RCP-5 -- STRATHAM WETLAND SOILS

Watershed	Very Poorly Drained Soils (acres)	Poorly Drained Soils (acres)	Total Wetland Soils (acres)	Percent of Total Land Area
Great Bay Watershed	299	893	1,192	12.8%
Squamscott River Watershed	485	1,615	2,100	22.6%
Coastal Watershed	0	50	50	<1.0%
Total Wetland Acres (determined by soil type)	784	2,558	3,342	35.9%

Source: Soil Survey for Rockingham County, New Hampshire, as prepared by the Soil Conservation Service (SCS) of the US Department of Agriculture. (Areas computed by RPC personnel using manual planimeter.)

2.4.5 Floodplains

A Flood Hazard Boundary Map was prepared for Stratham by the Federal Insurance Administration in 1975, and a more detailed Flood Insurance Rate Map (FIRM) was prepared by the Federal Emergency Management Agency (FEMA) in 1989. The preparation of these maps, plus the adoption of a special ordinance dealing with floodplain development, enables a town to participate in the National Flood Insurance Program (NFIP). The NFIP allows residents living in flood hazard areas to purchase flood insurance at low cost; however, insurance is only made available to communities which participate in the program. Stratham officially entered the NFIP program in 1989 when the Town adopted its Floodplain Management District. As of 1996, Stratham is a member of good standing in the NFIP.

Table RCP-6 on the following page indicates the acres of flood hazard areas within Stratham, broken down by regional watersheds. The flood hazard areas within the two sub-watersheds are included as part of the regional watershed flood hazard area totals.

TABLE RCP-6 -- FLOOD HAZARD AREAS

Watershed	Total Wetland Soils (acres)	Percent of Total Land Area
Great Bay Watershed	115	1.3%
Squamscott River Watershed	394	4.2%
Coastal Watershed	0	0%
Total Flood Hazard Acres	509	5.5%

Source: Flood Insurance Rate Map (FIRM) for the Town of Stratham, New Hampshire, as prepared by the Federal Emergency Management Agency (FEMA) in 1989. (Areas computed by RPC personnel using manual planimeter.)

2.4.6 Potential Surface Water Supplies

With two exceptions, all of the Town's surface water resources currently maintain a Class B water quality status as defined by the State Legislature. The first exception is the Class A Dearborn Brook Sub-Watershed. As mentioned previously, Dearborn Brook is used to augment the Exeter municipal water system. The second exception is the tidal Squamscott River, which, as previously cited does not support its Class B rating due to high bacteria counts.

Stratham does not use any portion of its surface water resources to meet water supply demands, and there are no plans to utilize these resources in the foreseeable future. The only surface water resource in town which has the requisite water delivery capability is the Squamscott River. However, this is an unlikely source due to the brackish nature of the river and its existing water quality problems. The remaining streams and rivers within Stratham have relatively small flows and it would probably be uneconomic to develop as water supplies.

Stratham's water supply demands are currently met by the Town's groundwater resources. In the future, if a need is demonstrated for a municipal water supply or additional public water supplies, the Town's groundwater resources would, in all probability, be the preferred option. These resources are described in the next section.

GROUNDWATER RESOURCES

Groundwater is a concentration of subsurface water, occurring in saturated soils and geological formations. It is resupplied through precipitation and surface water discharge. The water infiltrates the ground through an aerated zone where impurities are filtered out. The water then moves to a saturated zone where the pore spaces between soil particles are filled by the water. It is very important that the earth's surface be able to transmit water so that a certain percentage can be stored underground as "groundwater". If excessive compaction or extensive covering of the earth's surface occurs, the amount of water that can reach the saturated zone and

become groundwater is reduced.

Aquifers are found where land surfaces are permeable and the storage and transmission of water can take place. Aquifers having medium to high potential to yield groundwater occur in the New Hampshire seacoast area as alluvial deposits of sand and gravel (unconsolidated deposits) or in bedrock fractures (consolidated deposits). The major source of aquifer recharge in the seacoast region is through precipitation directly onto the aquifer's surface.

The unconsolidated deposits, also called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. They are found primarily along valley bottoms. These materials have abundant pore space to store water. Consequently, these stratified drift deposits of sand and gravel have become good sources of medium to high volume aquifers.

Bedrock fractures normally do not yield the same quantity of groundwater that stratified drift deposits do; however, they should not be overlooked in terms of contributing to a community's water supply needs. Bedrock fractures are more productive when they have a layer of sand and gravel over them. This allows recharge to occur directly from above. Bedrock fractures are usually adequate for low density domestic wells. In contrast, till aquifers usually have a lower yield, and therefore, are seldom used for water supplies. This is due to the compact nature of the deposit which is typically composed of a mixture of clay, silt, gravel and boulders. The transmission and storage of water is greatly reduced in this type of aquifer.

2.4.7 Stratified Drift Aquifers in Stratham

The groundwater resources of southeastern New Hampshire have been investigated extensively through a number of major studies from the mid 1970s to the present. The most recent and most important was conducted in the U.S. Geological Survey in cooperation with the NH Water Resources Division of NHDES in 1991 and resulted in publication of detailed aquifer delineation maps which today form the most accurate basis of stratified drift groundwater information in Stratham. The various investigatory efforts are described in chronological order below.

1. US Geological Survey (USGS): In 1977, the USGS identified several medium yield and low yield aquifers underlying the Town's major rivers and wetland areas. (Source: Availability of Groundwater in the Lower Merrimack River Basin, Southern New Hampshire, USGS, 1977).

2. US Army Corps of Engineers (USACE): In 1980, the USACE identified the existence of an aquifer in Stratham's southeast corner, at the end of Bunker Hill Road. The aquifer lies wholly within Stratham and receives recharge from precipitation only. The study describes the aquifer as "a Kame plain surrounded by Marine deposits." Although the study noted large amounts of clay in the northwestern portion of the aquifer, it was estimated that the aquifer could deliver roughly 153,000 gallons per day. (Source: Groundwater Assessment Study for 50 Communities in Southeastern New Hampshire, USACE; September, 1980).

3. US Army Corps of Engineers (USACE): In 1982, the USACE made an assessment of the aquifer identified in the 1980 study cited above. The 1982 study estimated that 70% of Stratham's population would be served by a municipal water system by the year 2030. The estimate of the aquifer's water delivery capability was upgraded to 360,000 gallons per day, which was deemed sufficient for a municipal water system. (Source: Southern New Hampshire Water Resource Study, USACE; August, 1982).

4. US Geological Survey (USGS): In 1990, the USGS published the most thorough and accurate study of the region's groundwater conditions to date. These reports, entitled Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey and Oyster River Basins, Southeastern New Hampshire and Geohydrologic Groundwater Quality, and Streamflow Data for the Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern New Hampshire, identified five aquifers within Stratham. These studies form the basis for the Town's existing aquifer protection ordinance, as well as the Town's Wellhead Protection Program which is currently underway.

A brief description of the aquifers identified by these studies is presented below. The aquifers are labeled on **Map RCP-5** ***Stratified Drift Aquifers and Wells*** as the *Stratham Hill Aquifer*, the *Bunker Hill Aquifer*, the *Winnicut River Aquifer*, the *Skinner Springs Aquifer*, and the *Guinea Road Aquifer*. The various characteristics of the aquifers, as detailed in the above referenced studies, are provided in the accompanying Table 5.

The Stratham Hill Aquifer

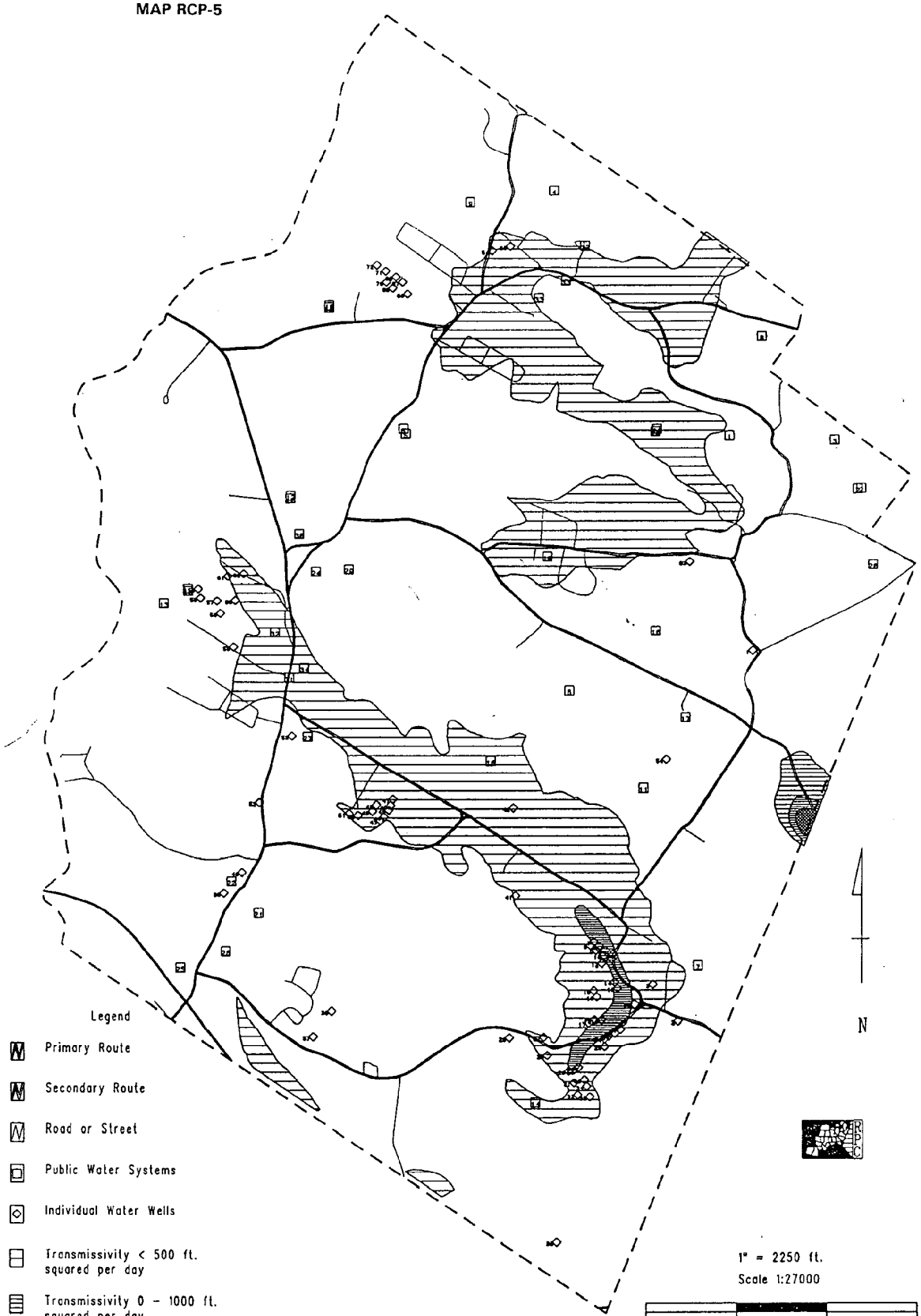
This is one of Stratham's two primary aquifers. It is located in the northeastern end of Town, with only a small portion falling within Greenland. The aquifer has a distinct "S" shape, hence its identification as the Stratham Aquifer. It begins along Stratham Lane and extends as far south as Winnicut Road. The aquifer is approximately 743 acres in size and lies mostly within Stratham, except for ten acres extending into Greenland. The aquifer's only sources of recharge are the wetlands which lie above its surface, and precipitation.

The aquifer's saturated thickness contours range from a high of twenty (20) feet within the aquifer's center, to as little as a few feet along the outer edges. The aquifer's groundwater contours range from a high of 140 feet in the aquifer's center, to a low of 110 feet along the outer edges. Within the aquifer, groundwater flows in a southwesterly direction. The aquifer in its entirety has a transmissivity rate of less than 500 feet[1] per day.

[1] "transmissivity" refers to the rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient, and is expressed in units of feet squared per day. The transmissivity (T) of an aquifer is equal to the horizontal hydraulic conductivity (K) of the aquifer multiplied by its saturated thickness (b); thus, T=Kb

Town of Stratham - Aquifers

MAP RCP-5



Sources: U.S.G.S. Groundwater Investigations, 1990 and 1992.

State of New Hampshire Water Resources Board, "Summary of Well Completion Report Data for the Town of Stratham"; 2/3/93.

State of New Hampshire Water Supply Engineering Bureau, Water Supply & Pollution Control Division, Dept. of Environmental Services: "Public Water Systems Inventory"; 1992.

Prepared by the
Rockingham Planning Commission
June 1, 1993 DRA

The Bunker Hill Aquifer

This is Stratham's other primary aquifer and is located wholly within Stratham. The aquifer spans the entire length of Bunker Hill Avenue. It begins along Patriot's Road, crosses Portsmouth Avenue, and extends as far south as Rollins Farm Road. The aquifer is approximately 873 acres in size. The aquifer's only sources of recharge are the wetlands which lie above its surface, and precipitation.

The aquifer's saturated thickness contours range from a high of twenty (20) feet within the aquifer's center, to as little as a few feet along the outer edges. The entire aquifer has a transmissivity rate of less than 500 feet per day, except for a small strip within the aquifer's southern end which has a transmissivity rate of 1,000 - 2,000 feet^2 per day.

The Winnicut River Aquifer

This is a strip-shaped aquifer which begins in Stratham and extends south into Greenland and North Hampton. The majority of the aquifer falls within North Hampton, with only small portions extending into Stratham and Greenland. The aquifer's total size is roughly 397 acres, with Stratham's portion consisting of 50 acres. The aquifer receives recharge from three sources: the wetlands above its surface, the Winnicut River, and precipitation. There are three water wells owned by the Hampton Water Works Company located above North Hampton's portion of the aquifer. These wells deliver roughly 1.42 million gallons of water per day. The majority of the aquifer has a transmissivity rate of 0 - 1,000 feet^2 per day, however, there are two places in Stratham where the rate is between 2000 - 4,000 feet^2 per day -- the highest rating.

The Skinner Springs Aquifer

This is a small aquifer (less than 40 acres in size) that Stratham shares with Exeter. The majority of the aquifer falls within Stratham, however, at least ten acres are located in Exeter. The aquifer is located between Portsmouth Avenue (Route 108), Stratham Heights Road and Guinea Road. The aquifer is so small that the USGS did not identify any saturated thickness contours, water table contours or the groundwater's flow direction. The aquifer has a transmissivity rate of less than 500 feet^2 per day.

The Guinea Road Aquifer

This is a small aquifer (less than 40 acres in size) which Stratham shares with Exeter. It is located less than 2,000 feet southeast of the Skinner Springs Aquifer and just southeast of Guinea Road. The aquifer's mass is fairly evenly split between Stratham and Exeter. The aquifer is so small that the USGS did not identify any saturated thickness contours, water table contours or the groundwater's flow direction. The aquifer has a transmissivity rate of less than 500 feet^2 per day.

TABLE RCP-7 -- AQUIFER CHARACTERISTICS

Aquifer	Size (acres)	Transmissivity	Saturated Thickness	Water Table Elevation (msl)	Direction of Flow
Stratham Hill	743	0-500 ft^2	0-20 ft.	140-110	southwest
Bunker Hill	873	0-2000 ft^2	0-20 ft.	110-70	varies
Winnicut River	397	0-4000 ft^2	---	50	varies
Skinner Springs	35	>500 ft^2	---	---	---
Guinea Road.	35	>500 ft^2	---	---	---

Source: *Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey and Oyster River Basins, Southeastern New Hampshire, USGS, 1989 and Geologic and Groundwater Quality Data for Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire.*

2.5 Wildlife and Plant Habitat

All wildlife have three basic survival requirements: food, cover, and water. Fish, amphibians, and waterfowl require the presence of water for spawning and egg laying. Vegetation provides necessary cover to serve as nursery habitat. Water also serves as spawning grounds for insects which are a source of food for a variety of fish and animals. Fur-bearers such as muskrat, otter, and beaver utilize wetlands as habitat. Coastal and inland marshes serve not only as breeding grounds for waterfowl, but also as critical resting and feeding areas during spring and fall migration.

The value of an area as habitat depends on a number of factors including size, contiguity with similar areas, and the amount of edge. Edge is the transitional area between habitat types. It consists of understory plants and early successional types of vegetation which provide both forage and cover for numerous species of birds and mammals. Edge can be created by utility transmission rights-of-way, crop and pasture lands, regrown old fields, and similar types of clearings. The habitat value and edge effect of an area may be significantly reduced if adjacent land uses and encroachments create barriers or threaten the area's integrity.

It should be noted that Stratham 's portion of the tidal Squamscott River is hydrologically connected to the Great Bay which is a federally designated National Estuarine Research Reserve. On the State level, the estuary is managed by the NH Coastal Program which is responsible for managing New Hampshire's coastal resources. The estuary provides prime habitat for many wildlife species. More than 90,000 birds reside in the estuary (source: Inventory of the Natural Resources of the Great Bay Estuarine System; NH Fish and Game Department, 1981). Thousands of Canada geese and black ducks rest and feed within the area during autumn months. Osprey are common during the spring and fall migration cycles. There are three rare and endangered species which live in the estuary: the bald eagle, common tern, and common loon.

Terrestrial mammals which utilize the bay include raccoons, whitetail deer, red fox, woodchuck, muskrats, chipmunks, grey squirrels, cottontail rabbits, mink, otter, and beaver. A complete inventory of all animals (and plants) which reside in the Great Bay can be found in the NH Fish and Game inventory cited above, as well as in the Great Bay National Estuarine Research Reserve Management Plan (prepared by the NH Office of State Planning in 1989).

In addition to excellent coastal habitat, Stratham also has important inland habitat areas including wetlands, river and stream corridors, forests (coniferous, hardwood, and mixed woodlands), and open lands (meadows and fields). These habitat types support a wide range of animals including game species such as deer, coyotes, raccoons, rabbits, and turkeys. Stratham 's prime wildlife habitat areas include: the wetland areas located in the south western area of Town, the corridors of the Squamscott River, Winnicut River, Mill River, and the forest lands, located in the central area and Stratham Park areas of Town. There is also quite a variety of wildlife and plant types located in wetland areas along the North Hampton border.

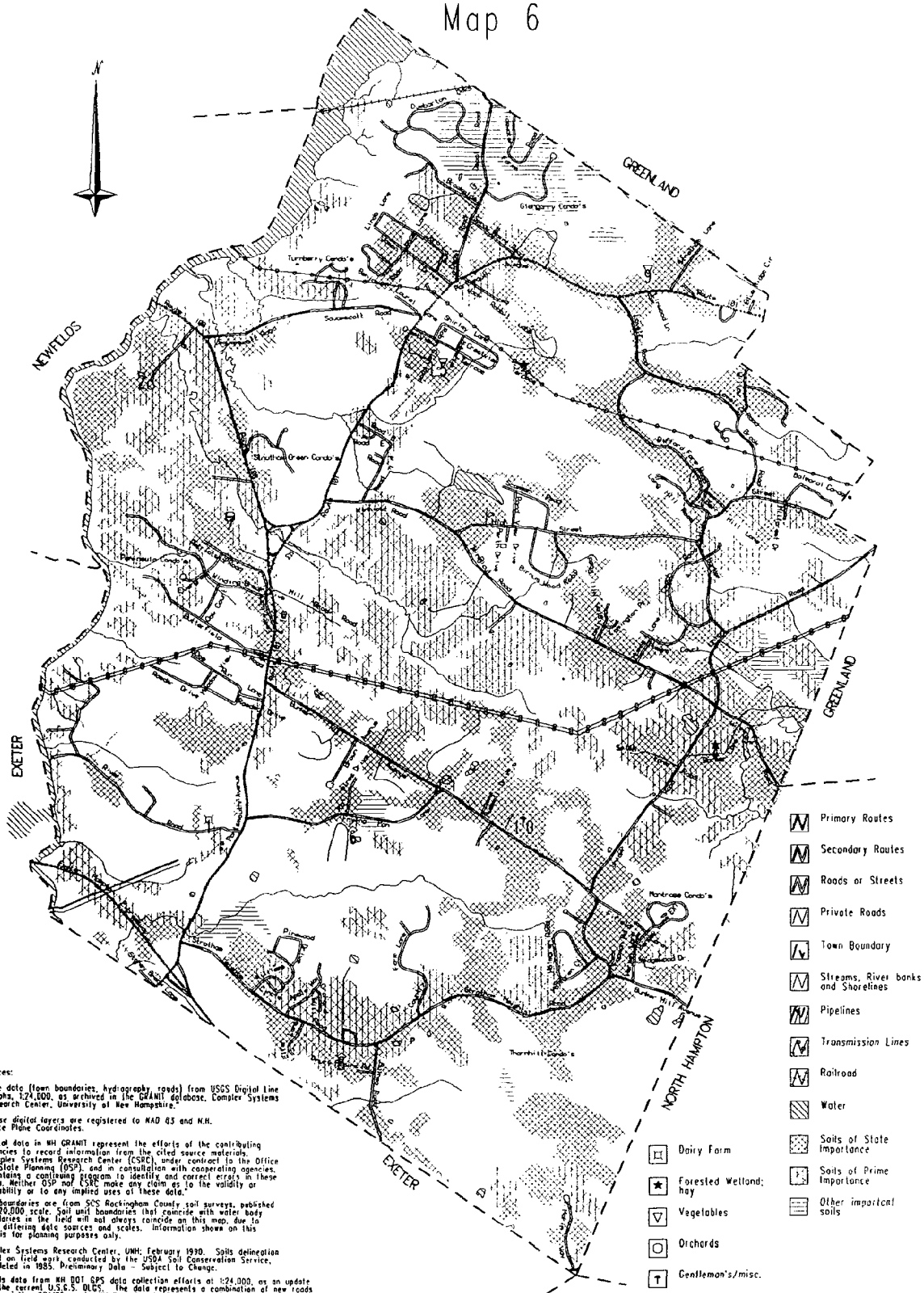
The Town's major watercourses are also the sites of fish stocking efforts by the NH Fish and Game Department. The Winnicut River is stocked with brook trout, rainbow trout, and brown trout. The Squamscott River is stocked with herring, smelts, bluebacks, and American shad.

Natural plant communities in Stratham are typical of coastal New Hampshire, with vegetative patterns reflecting soil and moisture conditions. However, according to the NH Natural Heritage Inventory (NHNHI), there are five (5) rare and endangered plant species and one (1) rare and endangered bird specie located in Town. Rare and endangered plant species in Stratham include the slender blue flag, climbing hempweed, robust knotweed, water-plantain spearwort, and stout bulrush. All of these plant species, with the exception of the water-plantain spearwort, are considered by the NHNHI as "imperilled in New Hampshire because of rarity". The water-plantain spearwort is considered "critically imperilled in state because of extreme rarity." The only rare and endangered animal species is the common moorhen. The common moorhen is also considered by the NHNHI to be "critically imperilled in the state because of extreme rarity."

2.6 Agricultural Lands

Soil information is not only useful as an indicator of wetlands and general development suitability, but also of important agricultural land. Important agricultural soils include "prime farmland" and "farmland of statewide importance". As defined by the US Soil Conservation Service (SCS), "prime farmland" has the soil quality and moisture content needed to produce sustained high yields when managed according to modern farming methods. Prime farmland can be farmed continuously or nearly continuously without degradation of the environment; produces the highest yield for the least amount of energy used; requires the least investment to remain productive; and is not susceptible to leaching from fertilizers or pesticides (Source: Soils of New Hampshire, Sid Pilgrim and N. Peterson, University of New Hampshire and the SCS, 1979). "Farmland of statewide importance" has many of the same attributes of "prime farmland" but is generally of lesser quality. In the New England context, these lands are viable and important for use as agricultural land. **Map RCP-6 *Farmland Soils and Active Farms*** found in the 1993 Open Space and Recreation Plan indicates that nearly 60% of the soils in Stratham are suitable for agriculture. These areas are located along the banks of the Squamscott River, along both sides of Route 108, within the northwest corner of Town, and a large patch located in

Stratham, N.H.
Farmland Soils and Active Farms
Map 6



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database. Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data."

Soil boundaries are from SCS Rockingham County soil surveys, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads. NH Department of Transportation, 1994."

Farms represent research by the Rockingham County Cooperative Extension; 1991.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA). Grant Award Number: NA57OZ0320.

Prepared by the Rockingham Planning Commission August 9, 1996 DRA

center of Stratham.

Aside from its obvious importance for growing food, agricultural land has value as a scenic resource, as wildlife habitat, and as a groundwater recharge area. Farming also provides economic benefits, especially to the local and regional economy. The loss of farmland has a direct impact on the landscape as well as an indirect impact on the local tax rate. The indirect economic benefit of farming relates to the real estate value of the farmland itself compared to the cost of providing public services to residents once the land is converted to residences. As demonstrated in the Cost of Community Services study conducted by the UNH Cooperative Extension Service in 1995, residential subdivisions cost the town more in terms of providing municipal services than is received in increased property tax revenue, whereas farmland and other open land produce more in revenues than they consume in services -- even when enrolled in the Current Use program.

While Stratham has lost a number of farms to residential development, it still retains a number of prominent working farms such as the Stuart Farm, Scammon Farm, Barker Farm, and others. There are approximately twelve working farms still remaining in Stratham. This figure is well above the number of active farms still in operation in adjacent communities. Although far fewer in number than in the past, these remaining farms have a very significant impact on the scenic and rural qualities of the community. The locations of these farms are indicated by symbol on the Farmland Soils and Active Farms Map.

TABLE RCP-8 -- PRINCIPAL COMMERCIAL FARMS IN STRATHAM

FARM NAME	MAP ID#	TYPE	ACREAGE
Scammon Farm	1	Dairy	210
Stuart Farm	2	Dairy	270
Gifford Farm	3	Forested wetlands; hay	129
Mill Valley Farm (in land trust)	4	Hay, vegetable	100+
Barker Farm	5	Vegetable, misc.	100+
Conterton Farm	6	Horse	30
French/Rausch Farm	7	Gentleman's/misc.	100
Berry Hill Farm	8		
Salt Box Farm	9	Vegetables, misc.	130+
Bunker Hill Orchards	10	Orchard	
Unnamed		Christmas trees	

Source: Rockingham County Cooperative Extension Office of the University of New Hampshire; and Town tax records.

2.7 Forest Resources

Forest land is a major renewable resource, providing both commodities (e.g., wood products and maple syrup), and non-commodity benefits (e.g., water resource protection, air quality maintenance, energy conservation, wildlife habitat, recreation and scenic quality).

According to an inventory maintained by the Rockingham County branch of the UNH Cooperative Extension Service, there are five "tree farms" within Stratham. The term "tree farm" refers to the National Tree Farm

Program sponsored by the American Forestry Association (AFA). In order for a woodland to receive tree farm certification, the owner must prepare a long-range forest management plan approved by a professional forester, and submit the plan to the AFA.

It should also be noted that Stratham has a number of very big or *"champion"* trees which are part of the AFA's Big Tree Program. Initiated in 1940, this program was designed to promote protection of the nation's oldest and tallest trees. The AFA publishes the National Register of Big Trees every four years, listing the vital statistics of all trees in the program. In New Hampshire, the Registry of Big Trees is administered by the UNH Cooperative Extension Service and the NH Division of Forests and Lands. Please contact these organizations for more information on how to nominate a tree. Stratham's champion trees include:_____

_____

Stratham's active tree farms and champion trees are depicted on Map 10 (Open Space Values) of the 1993 Open Space and Recreation Plan. This map also depicts the tax parcels within the "Current Use" program. Many of these parcels contain prime forest and farmland. The State-sponsored Current Use Assessment Program, as authorized by RSA 79-A, is a property tax abatement program which provides reduced property assessments of field, farm, and forest lands of ten acres or more in size. The current use program plays an important role in maintaining open space in the Town.

2.8 Sand and Gravel Resources

Beginning in 1989, state law has mandated that local master plans include a section which addresses construction materials. The amended statute, RSA 674:2 VIII-a, requires the following:

> "A construction materials section which summarizes known sources of construction materials which are available for future construction materials needs, including, at a minimum, the location and estimated extent of excavations which have been granted permits under RSA 155-E, as well as reports filed pursuant to RSA 155-E:2, I(d) with respect to non-permitted excavations."

Responding to this requirement, the intent of this chapter is to (1) identify the general location of construction materials relevant to potential future construction needs of the community, (2) identify the status of existing gravel pit and other excavation sites, both active and abandoned, in the Town, and (3) describe local regulatory framework for mining and excavation operations.

2.8.1 Identification of Construction Materials

Soils Based Inventory

The Rockingham County Soil Survey conducted by the NRCS identifies roadfill, sand, gravel, and topsoil. as potential construction materials. The NRCS rates the performance of each soil type based on its physical characteristics and test data conducted during the soil survey. For each intended use of the soil, a soil suitability rating is provided. The

ratings of "good", "moderate", "fair", and "poor" are used for roadfill and topsoil. For sand and gravel, the soils are rated as "probable" or "improbable" as to the possibility of sand or gravel being present.

The construction material suitability ratings for soil types that are likely to contain any of the four construction materials and are found in Stratham are shown on **Map RCP-7** ***Potential Construction Materials***[2] and listed in **Table RCP-9**. In the table, each soil number and name is provided, as well as the number of acres of that type of soil found in Stratham. Calculations of the number of acres for each soil type are based on the digitized soil map. For roadfill, if a soil has a rating of "good", it was included. For sand and gravel, only the "probable" rating is listed. In the case of topsoil, there were no soils which had a "good" rating so the only soil with a "moderate" rating was listed. Except for this case, if a soil had a rating less than good or probable it was left blank to make the table easier to read. Only the soils that had a good or probable rating in any category were included in the table.

TABLE RCP-9 -- SOIL POTENTIAL RATINGS FOR CONSTRUCTION MATERIALS

Soil Symbol	Name	Description	Road	Sand	Gravel	Topsoil
26A	Windsor	loamy sand, 0-3% slopes	Good	Prob.	-	-
26B	Windsor	loamy sand, 3-8% slopes	Good	Prob.	-	-
26C	Windsor	loamy sand, 8-15% slopes	Good	Prob.	-	-
30A	Unadilla	very fine sand loam	Good	Prob.	Prob.	Moderate
42B	Canton	gravelly, fine sandy loam, 3-8% slopes	Good	-	-	-
42C	Canton	gravelly, fine sandy loam, 8-15% slopes	Good	-	-	-
43C	Canton	gravelly, fine sandy loam, 8-15% slopes	Good	-	-	-
62B	Charlton	fine sandy loam, 3-8% slopes	Good	-	-	-
63B	Charlton	fine sandy loam, very stony 3-8% slopes	Good	-	-	-
63C	Charlton	fine sandy loam, very stony 8-15% slopes	Good	-	-	-
66B	Paxton	fine sandy loam, 3-8% slopes	Good	-	-	-
66C	Paxton	fine sandy loam, 8-15% slopes	Good	-	-	-

[2] The source for the soil information is the SCS soil map as digitized by Complex Systems of the University of New Hampshire and provided to the Rockingham Planning Commission in digital format. Soil maps are intended for general townwide land use planning. Due to the mapping techniques used, there may be different soil types within a mapped area of another soil type. Because of these limitations, the soil maps should not be used for site specific land use planning. The information is not designed or intended to be used for definitive identification of construction materials.

Soil Symbol	Name	Description	Road	Sand	Gravel	Topsoil
67B	Paxton	fine sandy loam, very stony 3-8% slopes	Good	-	-	-
67C	Paxton	fine sandy loam, very stony, 8-15% slopes	Good	-	-	-
115	Scarboro	muck	-	Prob.	-	-
125	Scarboro	muck, very stony	-	Prob.	-	-
305	Lim-Pootatuck		-	Prob.	-	-
313A	Deerfield	fine sandy loam, 0-3% slopes	-	Prob.	-	-
313B	Deerfield	fine sandy loam, 3-8% slopes	-	Prob.	-	-
314A	Pipestone	0-5% slopes	-	Prob.	-	-
395	Chocorua	mucky peat	-	Prob.	-	-
497	Pawcatuck	mucky peat	-	Prob.	-	-
510A	Hoosic	gravelly fine sandy loam 0-3% slopes	Good	Prob.	Prob.	-
510B	Hoosic	gravelly fine sandy loam 3-8% slopes	Good	Prob.	Prob.	-
510C	Hoosic	gravelly fine sandy loam 8-15% slopes	Good	Prob.	Prob.	-
510D	Hoosic	gravelly fine sandy loam 15-35% slopes	-	Prob.	Prob.	-
531B	Scio	very fine sandy loam 0-5% slopes	-	Prob.	Prob.	-
546A	Walpole	very fine sandy loam 0-5% slopes	-	Prob.	Prob.	-
547A	Walpole	very fine sandy loam,very stony, 0-3% slopes	-	Prob.	Prob.	-
547B	Walpole	very fine sandy loam, very stony, 3-8% slopes	-	Prob.	Prob.	-

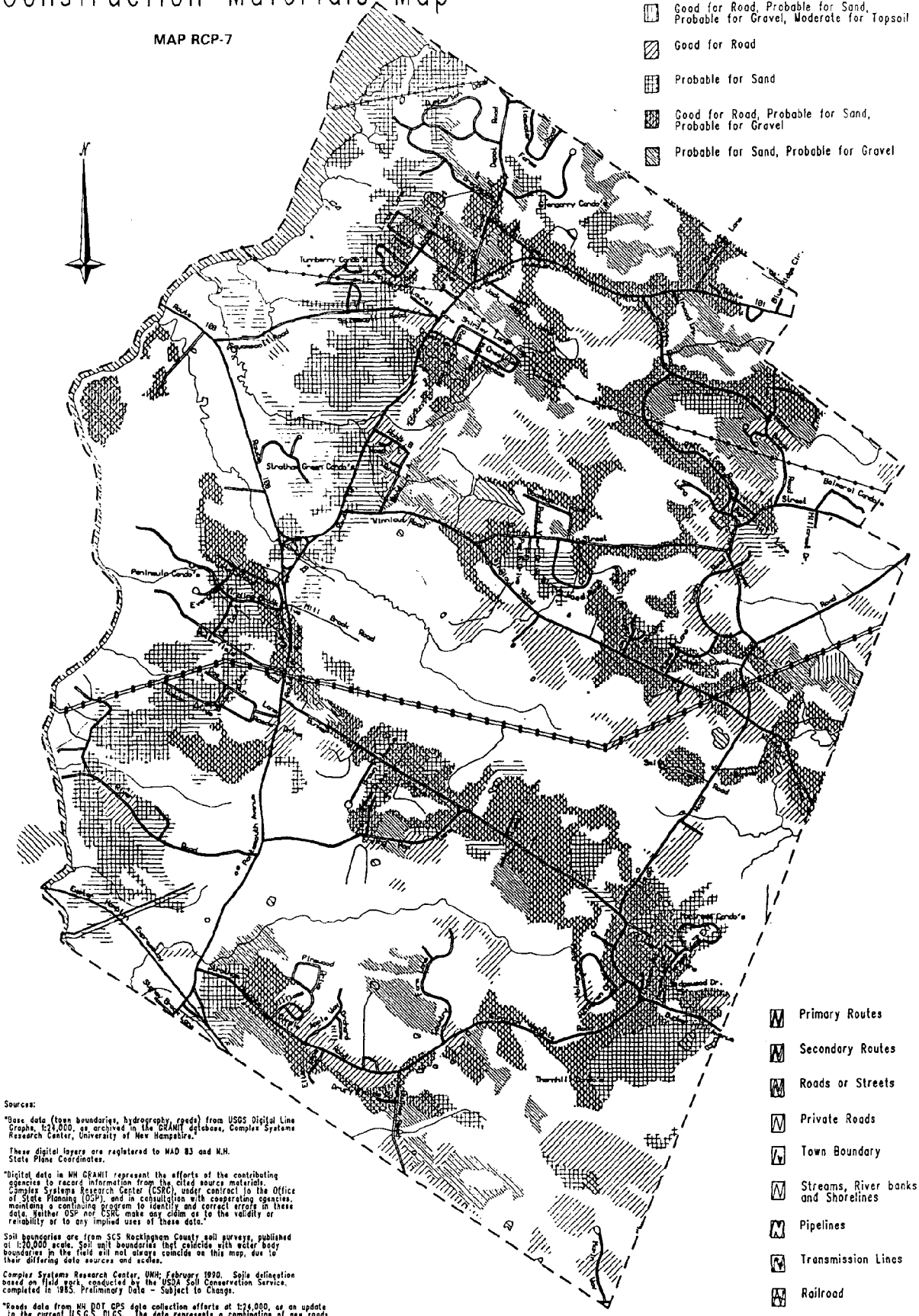
Total acreages for construction materials of the various types based on soil suitability data are as follows:

- Roadfill: Table RCP-9 shows that nineteen soils in Stratham are rated as good for use as roadfill. These nineteen soils total up to 2,743.5 acres. The largest single soil type that is good for roadfill is the 510 A-D, Hoosic, which has 1,582.3 acres in Stratham.

- Sand Sand is a very valuable material used in many kinds of construction. There are twenty soil types in Stratham that the SCS have given a probable rating for the presence of sand. The total size of the potential sand producing soils is 3,288.6 acres. Since only one of the soils is part of a complex soil, this number is fairly

Stratham, N.H.
Construction Materials Map

MAP RCP-7



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

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Soil boundaries are from SCS Rockingham County soil surveys, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA47OZ0237.

Scale 1:26000
1 in. = 2166 ft.

Prepared by the Rockingham Planning Commission
July 6, 1995 DEA

- accurate. Once again, the 510 A-D, Hoosic is the largest single soil type in this category, making up almost half of the total.

- Gravel: Gravel is a most sought after construction material for many types of industries. Due to the geology of Stratham and much of the coastal region, gravel deposits are not very plentiful. In Stratham, there are only nine soil types where finding gravel is rated as probable. This area covers a total of **2070.5**, which is over **76%** of the probable gravel soils are from one soil type - the 510 A-D, Hoosic.

- Topsoil: Topsoil deposits are the **smallest** of the four construction materials found in Stratham. None of the soils were rated good for topsoil and only one, the 30 A, Unadilla, was rated as moderate. Only 12.7 acres of the Unadilla soil are found in Stratham. A review of Table RCP-9 reveals that Unadilla is the only soil to be rated for all four types of construction materials. One soil, 510 A-C, Hoosic, are rated for each construction material except for topsoil.

Identification of Stratified Drift Aquifers

As described in section 2.4.7 above and shown on Map RCP-5, there are a number of important stratified drift aquifers located in Stratham. Since these aquifers consist mainly of stratified sand and gravel deposits, they are also a potential source of sand and gravel construction material. As expected the aquifers match up fairly closely with the sand and gravel soils identified from the NRCS soils map. When sand and gravel deposits are saturated with water, they forms an aquifer. There are, however, many instances where glaciers deposited large amounts of sand and gravel on the top of hills or on hillsides; these are referred to as eskers or drumlins. These areas would not contain large amounts of groundwater and would not show up on the U.S.G.S. maps.

Although stratified drift aquifers will always contain sand and gravel deposits, they are not necessarily suited for excavation to recover construction materials. Excavation that occurs below or too close to the water table will expose the groundwater to potential contamination and also increase evaporation of the water supply. For these reasons, excavation in or near such aquifers which have a realistic potential use as future water supply sources should be discouraged.

2.8.2 Existing Excavations

At present, there is one permitted excavation and several others which are neither permitted or considered abandoned or grandfathered under RSA 155E. **Table RCP 10 – *Existing Sand and Gravel Excavations in Stratham*** contains information regarding these sites and their current status.. A small backyard gravel pit on Bunker Hill Road is the only excavation that is shown on the most recent U.S.G.S. map and is the only pit that local officials recently permitted. The gravel pit is behind an existing house and only 5,000 cubic yards are slated to be removed from the site.

TABLE RCP 10 -- EXISTING SAND AND GRAVEL EXCAVATIONS IN STRATHAM

Excavation	Location	Approx. Size	Active	155-E Status
Bell & Flynn	Bunker Hill Ave. Map 10/Lot 25-1 Map 3/Lot 3	76 acres (20 open)	No (Court Injunction)	"Abandoned"; Reclamation plan filed 5/96
Bell & Flynn	Bunker Hill Ave. Map 4/Lot 10	12 acres (5 open)	Yes	"Abandoned"; no report filed per RSA 155-E
Sewall	Bunker Hill Ave.; Map 4 Lot 20	10 acres	Yes	Permitted 8/96
Source: Straham Code Enforcement Officer and RPC Planner				

2.8.3 Excavation Regulations

In 1988, the Stratham Planning Board adopted new Excavation Regulations that were based on a model developed by the Rockingham Planning Commission. These regulations incorporated all of the required provisions from RSA 155-E. Excavations are permitted in Stratham if the Planning Board issues an excavation permit after obtaining the required excavation and restoration plans and holding a public hearing. Given the scarcity of large amounts of construction materials in Stratham , the existing regulations are adequate protection to ensure safe excavations in the future.

3.0 WATER RESOURCES PROTECTION

Stratham does not have a municipal water system at this time and has no plans to develop one in the foreseeable future. Nonetheless, the protection of both surface and groundwater is a critical issue for the future. With the exception of numerous "public" water systems (defined as water systems with 15 or more service connection or used by 25 persons or more) scattered throughout the community, all of the Town's existing development relies on individual on-site wells. In a community with a municipal water system the municipality must, at a minimum, be concerned about the water quality of a limited number of production wells or surface water supplies. In Stratham essentially **all** of the groundwater must be protected since it is the universal supply of potable water.

As identified in Section 2.4 of this chapter, Stratham contains all or portions of three large stratified drift aquifers and two smaller ones. Together, these aquifers underlie over 2000 acres or nearly a quarter of the land area of the Town. While this apparent abundance of groundwater means there is adequate potential supply for the future, the Town must continue to protect these sources from contamination and over exploitation.

This chapter, which in part incorporates information contained in the 1993 Stratham Water Resources Management and Protection Plan (WRMPP), presents information about existing water withdrawls and discharges, public water systems, existing and projects demands for water and potential threats to the Town's water supplies.

3.1 Water Withdrawls and Discharges

Information regarding withdrawal and discharge rates for major groundwater users is required to be filed with the Water Resource Division (WRD) of the NH Department of Environmental Services in accordance with the provisions of the NH Code of Administrative Rules Wr 700. Major groundwater users are defined as those operations which use more than 20,000 gallons of water per day (gpd). For major groundwater users who are discharging to an aquifer, a Groundwater Discharge Permit must be obtained from the State. According to a recent review of WRD records, there is one major withdrawal taking place above the Town's stratified drift aquifers, and there are no holders of a Groundwater Discharge Permit above these resources. According to the 1993 Water Resources Management Plan, however, there are a number of additional major withdrawls and discharges not included in the NHDES records. These originate primarily from common wells and septic systems of residential cluster developments. In addition, a new major public water supply production well is currently under development by a private utility.

The current major withdrawls are described as follows:

Exeter Municipal Water System: The Exeter municipal water system maintains several wells along the Stratham-Exeter border which withdraw water from the **Skinner Springs Aquifer** . These wells are used to augment Exeter's municipal water system, which receives the majority of its water from the Exeter River. Currently, these wells contribute an average of roughly **80,000 gpd** to the municipal water system.

Thornhill Residential Development: consists of 70 two-bedroom, single family homes. The development is located in the southern end of Town, off of Rollins Farm Road. Using the septic system design standards of the Water Supply and Pollution Control Division (WSPCD), it is estimated this development withdraws roughly 21,000 gpd from the southern end of the Bunker Hill Aquifer.

Salt River Condominiums: located off Brookside Drive, consists of 78 single family units , withdrawing and discharging approximately 23,400 gpd from the groundwater.

Glen Gary Condominiums: located off Depot Road, consists of 114 single family units, withdrawing and discharging roughly 25,650 gpd from the groundwater.

In addition to these current "major" withdrawals, the **Hampton Water Works Co.**, concurrent with the preparation the master plan, had installed a test well for a public water supply production well in the **Winnicut River Aquifer** off Winnicut Road near the No. Hampton town line. If permitted by the Town, the PUC and the NHDES, the Company's intent is to withdraw up to 430,000 gpd to augment its water supply to serve its franchise area in Hampton, No Hampton and Jennes Beach (Rye). Information filed to support this proposal alleges that the well will draw water from an aquifer that is not hydrogeologically connected with the remainder of the Winnicut River Aquifer. Stratham disputes this conclusion. If this production well is permitted it is possible that there will be impacts upon the wetlands and nearby Winnicut River. Additionally, Hampton Water Works concedes that the operation of the well will render this aquifer unable to support any other withdrawal. It should be noted that the Winnicut Aquifer has the highest transmissivity (roughly related to yield) of all the aquifers identified in Stratham. It appears that the NHDES intends to grant approval of this withdrawal conditioned on the satisfactory outcome of a 6 month monitoring of associated impacts.

Regarding surface waters, there are no major discharges or withdrawls taking place in Stratham. However, there are three discharges taking place outside of Stratham which impact on the Town's surface waters. These discharges include: the Exeter and Newfields municipal wastewater treatment plants which discharge to the Squamscott River, and the Newmarket wastewater treatment plant which discharges to the Lamprey River. Although the Lamprey River is not located within Stratham, it is part of the Great Bay estuarine system. Tidal waters from this system flow into Stratham during periods of high tide. The previously cited 1992 WSPCD 305(b) Water Quality Report identified the Squamscott River as "not supporting" its class B legislative classification due to high bacteria counts. Stratham should work with the other communities along the Squamscott River and the Great Bay to develop a coordinated and effective water quality enhancement strategy fore these surface waters.

3.2 Existing Public Water Supplies

As mentioned previously, Stratham residents receive their water entirely from on-site water wells, and public water systems as defined by RSA 485:1. According to the RSA, there are three types of public water systems: community water systems, non-community water systems, and non-community, transient water systems. These systems are defined as follows:

> **Community Water System:** A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Community water systems are usually associated with residential developments.
>
> **Non-Community Water System:** A public water system which serves the same 25 people, or more, over six months per year. Examples of this type of system include: schools, government buildings, and large industries.
>
> **Non-Community, Transient System:** A public water system which serves a transient population of 25 people,

or more, over six months per year. Examples of this type of system include: restaurants, churches and parks.

According to the NH Department of Environmental Services records, there are 34 active public water systems located in Stratham. These systems are listed in **Table RCP 11 -- *Public Water Supply Systems in Stratham***. In addition, Map RCP-5 shows the location of the Town's various public water systems, on-site water wells, and USGS test wells.

TABLE RCP 11 -- ACTIVE PUBLIC WATER SUPPLY SYSTEMS IN STRATHAM

Community Water System	Non-Community Water System	Non-Community Transient Water System
(A) Aberdeen West	(Q) Acorn School	(CC) Carriage Stall
(B) Balmoral	(R) Bell & Flynn	(DD) The Commons
(C) Burnhaven	(S) Country Kids	(EE) The Coop *(inactive)*
(D) Glen Gary Condos	(T) Cornerstone School	(FF) Community Church
(E) Jewett Hill	(U) King's Highway	(GG) Stratham Hill Park
(F) Murrifield Cluster	(V) Market Basket	(HH) Sweet Dreams Bakery
(G) Montrose Condos	(W) NH Tech College	
(H) Pheasant Run	(X) Piper's Landing	
(I) Salt River	(Y) Rockingham News	
(J) Turnbury Condos	(Z) Shaws	
(K) Smith Farm	(AA) Town Offices	
(L) Stratham Green	(BB) Memorial School	
(M) Stratham Woods		
(N) Thornhill Condos		
(O) Winding Brook Condos		
(P) Lamington Hill Condos		

A full description of each of these systems can be found in the 1993 Stratham WRMPP and in the 1993 Stratham Wellhead Protection Program Report. The estimated current demand of the existing community water systems of 202,650, represents the demand as of 1993. At least six of these developments were not fully constructed at that time. When these developments reach build-out, the total estimated demand will rise by an additional 63,000 gpd. to approximately 265.000 gpd. It is interesting to note that the 24 hour design capacity of these community wells, which is estimated at 1.3 million gpd, far exceeds the current or forecasted demand.

3.3 Existing and Projected Demands

Table RCP 12 below provides an estimate of the Town's existing water demands. The number of people served by on-site water wells was derived by taking the Town's total population and subtracting that portion served by the various community water systems. The water demand estimate for the population served by on-site wells is based on the WSPCD water demand estimate for three-bedroom units. This should yield relatively high water demand estimates because the design standards of the WSPCD tend to be higher than actual metered demands.

Also included in Table 12 are the Town's major commercial, industrial and institutional water users. No attempt has been made to estimate agricultural demand.

TABLE RCP 12 - STRATHAM EXISTING WATER DEMANDS

Type of Water Supply	Population Served	Estimated and Actual Water Demand (gpd)
On-Site Wells*	3,429 people*	617,400 gpd^
Community Wells +	1,606 people +	202,650 gpd^
Non-Community Wells	2,625 students, staff and employees +	55,644 gpd^
Non-Community, Transient Wells	transient population not determined	9,480 gpd^ at peak demand (<3000 avg. daily demand)
Total Existing Demand	7,660 (not incl. transient)	885,174 gpd

* = Population estimate based on 2.5 residents per household.

\+ = Population based on 2.5 residents per household, or estimate provided by condominium association/well owner.

^ = Water demand estimate based on WSPCD design standards/water meters/well owner estimates.

Source: *Water Resources Management and Protection Plan, Town of Stratham, 1993*

To develop projected water demands the 1993 WRMPP used the most recent population projections developed by the NH Office of State Planning. For the year 2000, Stratham's population is projected at 5,992 residents; and for the year 2010, 7,522 residents are projected. In an effort to reasonably project the Town's future water demands, the following assumptions were made:

1. It is assumed that the various public water systems which are not fully built-out and have expansion plans (Winding Brook, Turnburry, King's Highway Plaza, etc.) will actually implement these plans. Thus, the water demand projections for these water systems will be based on the projects at full-build out.

2. Although new public water systems may be established in the future, it is not feasible to predict how many or how large they will be. Therefore, the establishment of future public water systems is not assumed in these projections. This will not effect the total projected demand for water since that is based on the projected population and a standard per capita consumption estimate.

3. The number of people to be served by individual on-site water wells was derived by taking the Town's population and subtracting the portion served by the various community water systems.

4. For the population to be served by individual water wells, their water demand projection will be based on the

following formula:

Projected Water Demand = *(Projected Population - Pop. served by public supplies) ÷ 2.5* × 450 gpd***

* = average person per household
** = WSPCD design standard for 3 bedroom dwelling unit

5. As with the existing water demand estimates outlined in RCP Table 12, the peak demands of the various public water systems will be used.

6. As with Table 12, Table 13 below includes projections for the Town's **existing** major commercial, industrial and institutional water users. However, the projection does not assume any additional major development not presently in the planning stages.

With the above assumptions in mind, **Table RCP 13** below presents Stratham's projected water demands for the years 2000 and 2010.

TABLE RCP 13 -- STRATHAM PROJECTED WATER DEMANDS

Type of Water Supply	Water Demand Projection - Year 2000	Water Demand Projection - Year 2010
On-Site Wells	713,700 gpd	989,100 gpd
Community Wells	265,500 gpd	265,500 gpd
Non-Community Wells	65,000 gpd	65,000 gpd
Non-Community, Transient Wells	10,680 gpd	10,680 gpd
Total Projected Demand	**1,054,880 gpd**	**1,330,280 gpd**

Source: *Water Resources Management and Protection Plan, Town of Stratham, 1993; Additional analysis*

Based on the available aquifer information, there appears to be more than sufficient groundwater supplies in Stratham to meet current protected demand. Within the planning horizon of this document it is expected that the Town will continue to rely exclusively on its groundwater resources to supply future water needs. This water will be provided through a mixture of individual on-site wells and common wells serving the various types of public systems such as currently exist. Although no specific plans exist to develop a municipal water system, the possible future need for such a system has been discussed for supplying water to support additional commercial and industrial development in the community. In the event that such plans are pursued it is likely that either or both the Bunker Hill or Stratham Hill Aquifers would be identified as the sources of supply. To pursue the development of a municipal water system a detailed water supply study would have to be undertaken to address issues including aquifer capacity, water quality, water storage, treatment and distribution facilities, wellhead protection, and financing of capital and maintenance costs.

The secondary impacts of operating the production wells would have to be investigated as well, including effects on the water table, wetlands, stream flows and adjacent public water supply wells.

The concern at this stage is to preserve the Town options for developing a municipal water supply system in the future. The development of the Hampton Water Works well within the Winnicut Aquifer may preclude that aquifer from further extraction for a municipal system. The Town should therefore endeavor to preserve these options for the Bunker Hill and Stratham Hill aquifers.

3.4 Potential Pollution Threats

An essential part of protecting the Town's water supply is to prevent its contamination from pollution sources. To accomplish that is necessary to understand the nature and extent of potential pollution threats in Stratham and then to determine what, if any, additional measures should be taken to eliminate or diminish those threats.

The State of New Hampshire has delineated two general types of pollution sources: nonpoint and point. Nonpoint pollution, which is of greater concern in Stratham, is defined as pollution sources which are diffuse in nature and discharge pollutants over an area into the environment. Typically, nonpoint sources of pollution include urban and rural runoff, leachates from land disposal of solid and liquid wastes, agricultural runoff, sediment from tilling, timber harvesting, construction activities and road salt applications. Nonpoint sources can be difficult to pinpoint since some are of a short-lived nature, induced by storm events or activities occurring over a brief period of time. Some nonpoint sources, such as leachate from landfills and failed septic systems, are more easily located.

Point pollution sources are defined as any discernible, confined or discrete conveyance from which pollutants are or may be discharged, including but not limited to: pipes, ditches, channels, tunnels, conduits, wells, containers, rolling stock, concentrated animal feeding operations or vessels.

3.4.1 Potential Nonpoint Pollution Sources

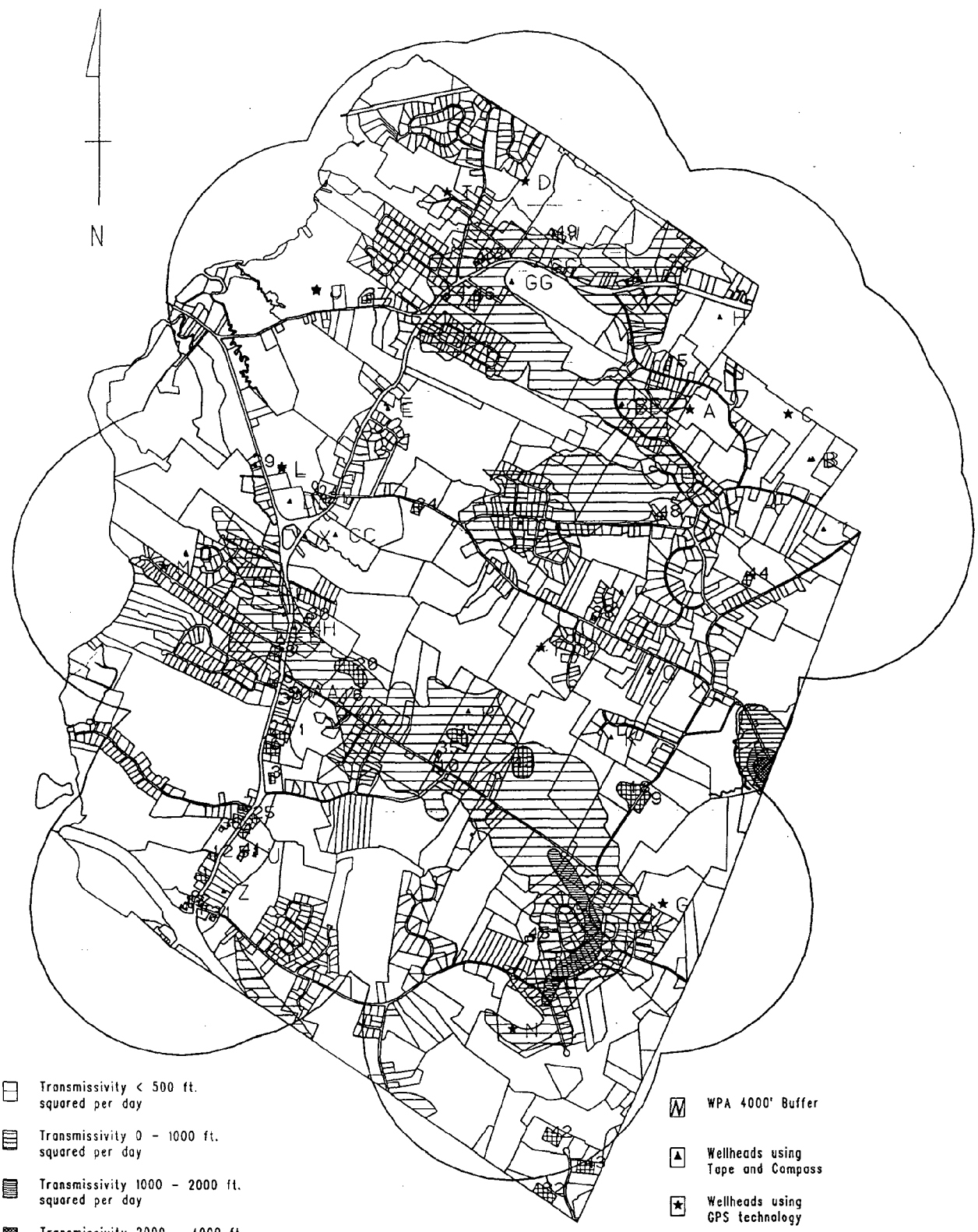
Based on information contained in the 1993 WRMPP and information from local officials, the potential nonpoint pollution sources in Stratham are identified and shown on the **Map RCP- 8 -- Wellhead Protection Zones and Potential Pollution Sources Map**. A brief description of these sources is presented below; refer to the WRMPP, page 24 for additional detail. Unless stated otherwise, the sources described do not have monitoring wells located on-site and no detailed water quality data is available. In Stratham, examples of existing nonpoint pollution sources include:

Salt Piles and Snow Dumps: There is one Town-owned salt pile located along Bunker Hill Avenue at the site of the Town Garage. This facility stores approximately 150 tons of road salt at any given time. The salt is stored in an enclosed area with a concrete floor underneath. Bell & Flynn Inc., also have a salt pile at their Bunker Hill Avenue facility. This facility stores as much as 30 tons of road salt at any given time. The salt is stored in an enclosed area with a concrete floor underneath. (Source: RPC Nonpoint Inventory and the Town Road Agent.)

Road deicing (salt): All of the paved roads in Stratham receive some degree of salting during the winter months,

Stratham Wellhead Protection Program

MAP RCP-8



- Transmissivity < 500 ft. squared per day
- Transmissivity 0 - 1000 ft. squared per day
- Transmissivity 1000 - 2000 ft. squared per day
- Transmissivity 2000 - 4000 ft. squared per day
- Potential Contamination Sites
- WPA 4000' Buffer
- Wellheads using Tape and Compass
- Wellheads using GPS technology

Scale 1" = 2500 ft.

0 feet 2500 5000 7500

Prepared by the Rockingham Planning Commission

June 10, 1993 DRA

with the exception of Jack Rabbit Lane which is a dirt road. (Source: RPC Nonpoint Inventory and the Town Road Agent.) There are 13 well sites in Town which have been contaminated by road salt. The majority of occurrences have taken place along Routes 101 and 108, however there are a few sites along Bunker Hill Avenue and Winnicut Road. All of the wells have been replaced by the NH Department of Transportation. The locations of these sites are denoted by the symbol "S" on Map RCP 8. (Source: Records of the DES Waste Management Division and NH DOT.)

Municipal Landfill: There is an abandoned municipal landfill located along the western side of Union Road. Use of the landfill was discontinued in 1980, after thirty years of service. The landfill is unlined, however the site has been capped with clay, loamed and seeded. A landfill closure plan was submitted to the Waste Management Division of the NH Department of Environmental Services in January of 1992, however, the plan has yet to be approved by the State. There are four monitoring wells located on-site. After four rounds of well testing, no significant water quality problems have been detected. Two nearby streams have also been sampled without detecting any serious water quality problems. The landfill currently serves as a transfer station where residents can dispose of bulky items, metals, brush and recyclables. (Sources: discussions with the Town's Administrative Assistant; and records of the DES Waste Management Division.)

Excavation Operations and Maintenance of Excavation Equipment: There are three active excavation sites in Stratham, all located along Bunker Hill Avenue. One is permitted; two are not. See section 2.8 above for more information.

Gas Stations, Engine Repair and Automotive Shops: There are ten such uses within Stratham, including: automotive service establishments (Stratham Tire, Sullivan Tire, Monroe Muffler, Undercar Specialist), car dealerships (Gill's Jeep/Eagle, Honda Barn, Exeter Subaru) and gasoline stations (Charter Gas and Stratham Village Market, and the C&E Mobil Station. All of these sites are located along Portsmouth Avenue. There are also two small engine repair shops in Town: Steele Engine Repair (Portsmouth Avenue), and a site located off of Bunker Hill Avenue. The locations of the establishments listed above are denoted by the symbol "A" on Map 8.

Pesticide Application Sites, Farms and Agricultural Uses: There are ten agricultural uses in Stratham which have used pesticides in the recent past. These operations grow a variety of produce including: vegetables, flowers, berries and tree fruit. In addition, there are two nurseries and one greenhouse in Stratham. There are also six horse farms and two dairy farms in Stratham. The locations of the pesticide application sites, nurseries, greenhouse and the Stratham Agway are denoted by the symbol "PA" on Map 8, while the horse and dairy farms are denoted by the symbol "F". For a detailed description of the pesticides used at each site, see Appendix C of the WRMPP. It should be noted that Stratham participates in the Seacoast Area Mosquito Control (SAMC) program. After flooding events, SAMC crews spray a biological pesticide ("BTI") on the wetlands along the Squamscott River, and, to a lesser extent, freshwater wetlands throughout Town. (Sources: NH Department of Agriculture and discussions with local officials.)

Urban Runoff and Storm Drains: In early 1992, the Rockingham Planning Commission conducted a partial field inventory of potential threats for the eastern half of the RPC region. Storm drains which handled runoff from paved areas of over one acre in size were included in the inventory. In Stratham, there are 13 such storm drains

scattered throughout Town. The locations of these sites are denoted by the symbol "**R**" on Map 8.

Print Shops and Printing Presses: There are two such operations in Stratham. Rockingham County News and Squamscott Press are both located along Portsmouth Avenue. The locations of these sites are denoted by the symbol "**P**" on Map 8. Source: Town Business Records.

Commercial Operations: There are a number of commercial operations in Stratham which store, use and dispose of hazardous chemicals and/or substances. Along Portsmouth Avenue, these operations include: Stratham Fuels Inc. (fuel storage); the Antique Repair Co. (paints, thinners and furniture stripping); Stratham Hill Bicycle (paints and cleaning solvents), and; Eurocleaners (dry cleaning chemicals). There is also the B.R. Jones Roofing Company (metal work, asphalt and tar storage) located along Winnicut Road. In addition, there is a woodworking shop located along Lovell Road and a taxidermy shop along College Road (Route 108). The locations of these sites are denoted by the symbol "**C**" on Map 8. Source: Town Business Records.

Beauty Salons: Beauty parlors often use chemicals which, if disposed of improperly, could pose a threat to groundwater resources. There are five such establishments in Stratham. Both the Stratham Plaza and the King's Highway Plaza contain such uses. Small-scale beauty shops are also located along Squamscott Road, Winnicut Road and Portsmouth Avenue. The locations of these sites are denoted by the symbol "**B**" on Map 8. Source: Town Business Records.

Industries and Manufacturing Establishments: There are several industries in Stratham which use regulated substances as defined by the NH Groundwater Protection Act of 1991 (RSA 485-C). The Town's primary industrial area is the Stratham Industrial Park located in the southern corner of Town along Marin Way. Chief among the park's industries are: Hewlett - Packard (use of regulated chemicals); Complex Medical Products (use of regulated chemicals), and; Lindt & Sprungli USA (food processing - chocolate). The locations of Stratham's industries and manufacturing operations are denoted by the symbol "**I**" on Map 8. Source: Town Business Records and discussions with various local officials.

Septic Systems and Leaching Fields: Generally speaking, septic systems are considered nonpoint pollution sources because of their discharge of effluent into the ground. The threat presented by such systems increases when a system fails and the wastewater is not treated sufficiently. There are several residential developments in Stratham that are served by large septic systems. The most significant septic system is the one for Turnburry Condominiums. This development holds a Groundwater Discharge Permit issued by the State. The permit allows the development's septic system to discharge as much as 30,000 gallons of wastewater per day into the ground. The other holder of a Ground-water Discharge Permit is Stratham Green Condominiums. Their permit allows the development's septic system to discharge as much as 18,000 gallons of wastewater per day into the ground. There are approximately 450 housing units served by community septic systems and 1600 housing units served by individual on-lot systems.

According to a recent review of records maintained by the Code Enforcement Officer, instances of septic system failure have been scattered throughout Town, with the majority of cases being those systems located in close proximity to the major rivers and streams, as well as in areas containing high water tables. Many of the failed systems were installed before the NH Water Supply and Pollution Control Division established rules regarding

septic system placement.

Much of the remaining undeveloped areas of Stratham have a high percentage of soils which contain moderate to severe limitations for the placement of on-site septic systems. (See *RCP Map 2 -- Soil Potential for Development*) This does not mean that areas shown with very low or low potential cannot be utilized at all for the placement of septic systems because some environmental constraints can be mitigated through corrective measures taken by the developer. The accuracy resolution of the soil maps may also mask smaller areas of greater potential that are within large areas of poor soils. It does indicate that a great deal of care must be exercised in developing in such areas to avoid pollution threats.

3.4.1 Potential Point Pollution Sources

Stratham is relatively free of point pollution sources, i.e., those sources confined to a specific, discernible location. There are no CERCLA (Superfund) sites in Town, nor are there any National Pollution Discharge Elimination System (NPDES) permit holders. Such permits are usually required for the discharge of treated waters into a surface water resource.

3.5 Existing Policies for Water Resources Protection

Over the years Stratham has put in place a number of policies, in the form land zoning ordinances and land use regulations, that directly or indirectly act to protect the surface and groundwater resources of the Town. In many cases, Stratham has been at the forefront of such efforts in the RPC region. For example, the Town was the first community in the region to enact a shoreland protection ordinance and wellhead protection program. It was one of the first to enact wetlands and aquifer protection measures, and recently updated and adopted comprehensive erosion sedimentation and stormwater management measures in its site plan and subdivision regulations. Following is a brief description and rationale of the major policies in place which help protect the resource.

- **Aquifer Protection District**: adopted in 1992, this overlay district is key to protecting the five USGS-defined aquifers from land uses and site activities that are detrimental to the quality or quality of the resource. The district boundaries are defined by the lastest USGS aquifer delineation study (1991). Impervious lot coverage is limited to 20% to ensure groundwater recharge; land uses involving on-site disposal, storage or processing of hazardous materials, undergound storage tanks, and a variety of high-risk commercial, industrial and utility uses are prohibited. Provisions of the town's land use regulations permit the town to require a developer to prepare a hydrogeological study of potential impacts of development, where warranted. The ordinance lacks adequate provisions for regulating the volume of water extracted for commercial purposes and should be reviewed and updated.

- **Wellhead Protection Program**: adopted by Stratham in 1993, this state established program, is designed to help municipalites enhance their protection of groundwater supplies through improved education, monitoring and management of potentially harmful land use activites within the recharge areas of public water supply wells. As a result of this program, NHDES reclassified all of the groundwater in Stratham as "GA-1". This designation provides enchanced protection of the groundwater through implementation of "best management

practices" on the part of landowners and through active compliance monitoring by the Town. Stratham was the first community in the RPC region to implement a wellhead protection program and the first in the state to address the need to protect public (non-municipal) water supply wellheads.

- **Wetlands Conservation District**: Adopted in 1984, this overlay ordinance severely and properly limits the type and extent of development activity in and near wetlands. The intent of the district is to protect important wetlands and preserve their valuable natural functions of flood storage, pollution assimilation and wildlife habitat, among others. The district is defined by the presence of hydric A and B soils. The ordinance should be updated to make the definition of wetlands consistent with that of the State Wetlands Council.

- **Shoreland Protection District**: Adopted in 1985, this overlay ordinance, which was the first of its kind in the RPC region, limits the type and extent of development within 150 feet of tidal waters and within 100 ft. of perennial streams. The intent is to protect environmentally sensitive shorelands. The buffer of undisturbed land that results helps protect the surface water by filtering runoff and provides critical habitat fro many species that live in tidal marshes and nearby shoreland environments. It also help maintain the scenic quality of the Squamscott River and its tributaries.

- **Floodplain Management District**: This overlay district, required for the Town's participation in the Federal Flood Insurance Program, ensures that septic systems are not sited in flood prone areas and that any structures constructed in the District are adequately flood proofed, and that they will not cause an increase in flood hazards downstream.

- **Cluster Development**: Stratham allows and encourages cluster development as an alternative to standard residential subdivision practice. Cluster Development indirectly protects water resources by encouraging the placement of buildings, roads and septic systems where they are best suited to the land. It also can help protect large useable areas of open space in exchange for higher lot densities. The actual implementation of cluster development has not always met these objectives and has sometimes lead to higher densities and less useable open space than intended. The Cluster provisions of the ordinance should be reviewed and revised to increase the planning board's discretion in approving cluster development design and improve the outcome of these developments.

- **Soil Based Lot Sizing**: Incorporated in the Town's subdivision and site plan regulations, soil-based lot sizing is the accepted standard in Rockingham County as the best method for determining the density of development in areas served by on-site septic systems. By tieing development density to the soil's capacity to assimilate waste effluent, soil-based lot sizing ensures that groundwater will not be degraded by recharge from septic systems.

- **Erosion Control/Stormwater Management**: Stratham's subdivision and Site Plan Review regulations require erosion control plans to be prepared whenever an area greater than 20,000 sq. ft. will be disturbed or when the construction of a road will be involved. This ensures that sedimentation and sediment-borne pollutants will be blocked from reaching surface waters. Likewise, stormwater management plans are required when warranted and ensure that runoff from developed areas will not cause erosion and will be treated to remove sediment and some pollutants before being conducted to natural water courses.

- **Excavation Regulations**: Stratham regulated excavations under the provisions of RSA 155-E. The town has designated the Planning Board as the regulator. The ordinance requires the reclamation of excavation sites, requires buffers strips around excavation sites, and prohibits excavations that would damage a known aquifer. (The Aquifer Protection District also prohibits excavation closer than 6 feet from the seasonal high water table above the identified aquifers.) The current regulations should be revised to become consistent with 155-E regarding the handling of grandfathered and abandoned gravel pits.

The policies, regulation and ordinances described here are necessary and important for the protection of the Town's water resources. They are generally up to date and, taken together, provide the tools necessary to protect the resource. As with all such policies and regulations they require vigilance in enforcement and should be periodically reviewed to ensure they are effective, fair and reasonable.

4.0 OPEN SPACE AND LAND CONSERVATION

One of the most important and defining elements of Stratham as a community and as a place are its open spaces. These areas which include forested lands, active agricultural lands and pasture and old-fields, as well as wetlands and undeveloped shorelands are very important both to the community and to the natural environment for a variety of reasons as briefly described below.

- Recreation and Scenic Quality: Open space lands help define the scenic and rural quality of the community. Farmland in particular with its wide open fields and pastures are critical scenic elements. Open space is also important for many forms of outdoor recreation including hunting, cross-country skiing, hiking, mountain biking and nature observation.

- Water Resource Protection: Open spaces are critical to maintaining the quality and quantity of surface and groundwater. They provide unpolluted recharge to the town's aquifers, help assimilate pollution from various land use activities before they reach water sources, and help reduce stormwater, erosion and flood damage that would result from major storm events.

- Wildlife Habitat: Expanses of open space area are vital to wildlife. Each of the major forms of open space in Stratham (agricultural/open fields and pastures, old fields, forested areas, wetlands and undeveloped shorelands) provide habitat to difference important species. In addition, stream shorelines, continuous strips of undeveloped land and even utility corridors are vital to wildlife as corridors links important habitat areas.

- Economics: Agriculture and forestry, particularly the former, have been an important part of Stratham's economy for since settlement. While this is much less true today, these land continue to contribute to the Town's economic well-being both directly and indirectly. Aside from the direct economic activity they represent, they also help reduce the cost of community services that would arise if these open space were replaced with residential development. This has been well documented for Stratham and several other New Hampshire Communities in the Cooperative Extension Report *Does Open Space Pay?* (UNH Cooperative Extension, 1995).

- Education: Operating farms are the training grounds for the next generation of farmers in the community; they can also help education non-farmers about the importance of our agricultural resources; Wetlands and other wildlife habitats can be used for ecological research and environmental education for students of all ages.

Although Stratham has sizable amounts of open space of all varieties remaining, more is lost every year. It is increasing important for the community to understand what is has left and take decisive steps to protect the most important parcel for the future. The following section identifies the major conservation and protected land in the Town.

4.1 Protected Open Space and Conservation Lands

This section briefly describes the sizeable publicly-owned and protected lands in Stratham. These parcels, as well as other incidental parcels, are depicted on **RCP Map 9 - "Protected Open Space and Conservation Lands."** It should be noted that even though a parcel is publicly-owned, it is not necessarily protected forever. The Conservation

Commission should encourage the Board of Selectmen to put covenants (land restrictions) on critical Town-owned open spaces. This concept applies to State-owned lands as well. If the State is not interested in any permanent means of protection, the Commission should pursue an option or right of first refusal for the land. The following is an inventory and description of public and protected lands in Stratham..

Public Land

Town-owned

The Town of Stratham owns a significant amount of open space, most of which is located in the vicinity of Stratham Hill. The Town's major land holdings include: Stratham Hill Park (108 acres); the "Gifford" land, adjacent to Stratham Hill Park (86 acres); the site of the new elementary school (37 acres); and the conservation land which lies between Lovell Road and Gophered Farm Road (13 acres).

State-owned

The State of New Hampshire owns two parcels in Town, both of which are located adjacent to the Squamscott River at Chapman's Landing. This site has a total area of about seven acres, and is managed by the N.H. Fish and Game Department. It also owns the land associated with the Sandy Point Learning Center near the Greenland town line along the Squamscott.

Quasi-Public

In Stratham, quasi-public lands include those which are owned by the Boston and Maine Railroad; and transmission-line easements owned by the Public Service Company of New Hampshire for electricity, and by Northern Utilities for gas. These corridors can provide important links to open space lands.

The 91-acre site of the New Hampshire Vocational Technical College is also included in this category. As discussed in the Recreation Chapter of the Master Plan, this tract contains several playing fields available for public use.

Private Protected Land

In Stratham, there are generally two types of mechanisms which have protected privately-owned open space lands: 1) conservation easements; and 2) cluster development.

Conservation Easements

a) Stuart Farm. This site is located in northwestern Stratham, and is bisected by Mill Brook. At 173 acres, this is the Town's largest tract of protected land. The conservation easement (development rights) is held by the N.H. Department of Agriculture. Public access is allowed by permission only.

b) Wiggin Conservation Land. This 37-acre parcel is located adjacent to Jewett Hill Brook. This land

is ecologically important - containing rare and endangered plants, and comprising a portion of the tidal wetland system of the Squamscott River. The conservation easement is held by the State of New Hampshire. Public access for transitory recreational purposes is allowed.

c) Turnberry Open Space. This land is the open space portion of the Turnberry Condominium development. It is a 61-acre tract located next to the Wigging parcel (described above), adjacent to the Squamscott River. It also contains a significant amount of tidal wetlands. The easement is held by the Society for Protection of New Hampshire Forests. Public access is allowed by permission only.

d) Salt River Open Space. This 51-acre tract is the open space portion of the Salt River Condominium development. Like the parcels described above, this land has ecological importance and contains tidal wetlands. The easement is held by the Rockingham County Conservation District, and public access is permitted.

Cluster Development Open Space

In 1983, the Town of Stratham adopted a cluster development provision in its Zoning Ordinance. The cluster ordinance has led to many tracts of open space being protected, in perpetuity, especially along the Squamscott River.

The following is a list of the cluster developments which have set aside significant tracts of open space to remain undeveloped, in perpetuity:

Glengarry	The Meadows
Pheasant Run	Thornhill
Aberdeen East	Stratham Woods
Aberdeen West	Peninsula
Balmoral	Stratham Green
Lamington	Turnberry
Muirfield	Salt River
Montrose	Jewett Hill

4.1 Un-Protected Open Space

The Community Stewardship Process, which Stratham undertook with assistance from the RPC, NHOSP and the Coastal Program during development of the Master Plan Update, focused a great deal of discussion on protecting the remaining open space in the community. As the Town's 1989 Open Space and Recreation Plan had done, the Stewardship Process identified several areas where large contiguous blocks of open space remained and which are important to protect as open.

Large tracts of open space are important to consider when planning for the Town's future open space needs. In general, the larger tracts of open land are of greater value in terms of open space benefits, e.g., farming, forestry, recreation,

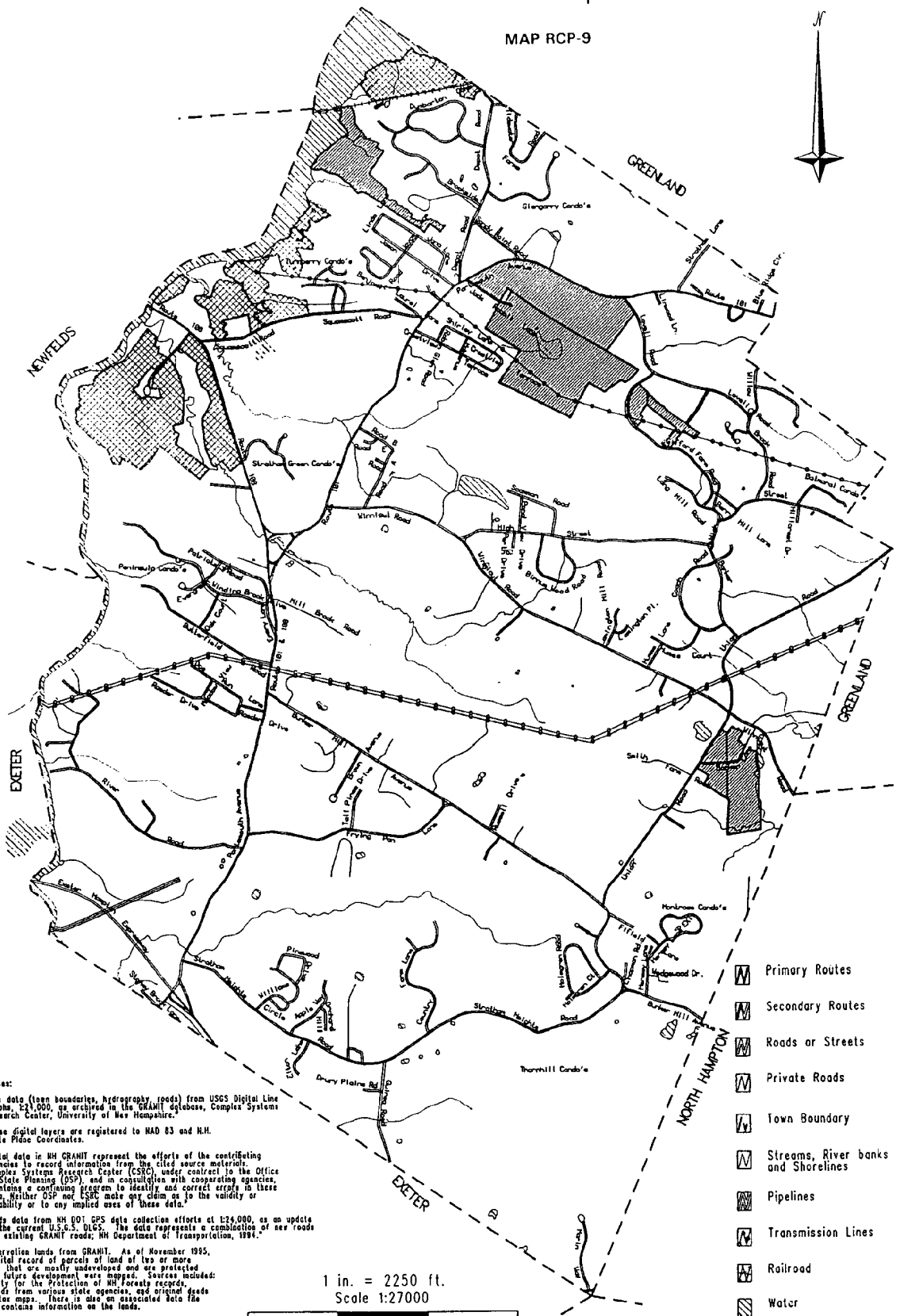
wildlife habitat, aesthetics, etc. For this reason, the Town should endeavor to acquire and/or protect those large lots which are contiguous to publicly-owned or otherwise protected parcels.

Significant concentrations of open space are located along the Squamscott River, between N.H. Route 101 and Jewett Hill, and in the central and southern parts of Town. As identified in the Stewardship Process these a large continuous of relatively undeveloped land, generally in the form a "S" shape, extends from Stratham Hill Park south through the center sections of the Town. This is shown on ***Map RCP 10 – Rural Character Corridor Map*** which appeared in the Community Stewardship report as the "Rural Character Corridor Map".

One of the recommendations arising from the Stewardship Process was that the Town (presumably through the Conservation Commission) identify the most important of these properties to protect and then actively pursue the acquisition of conservation easements and development rights to preclude future development. If successful, this will be a vital step in protecting much of the most important open space remaining in Stratham and will do much to preserve that which defines the physical character of the community.

Town of Stratham
Conservation Lands Map

MAP RCP-9



1 in. = 2250 ft.
Scale 1:27000

0 Feet 2250 4500 6750

Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

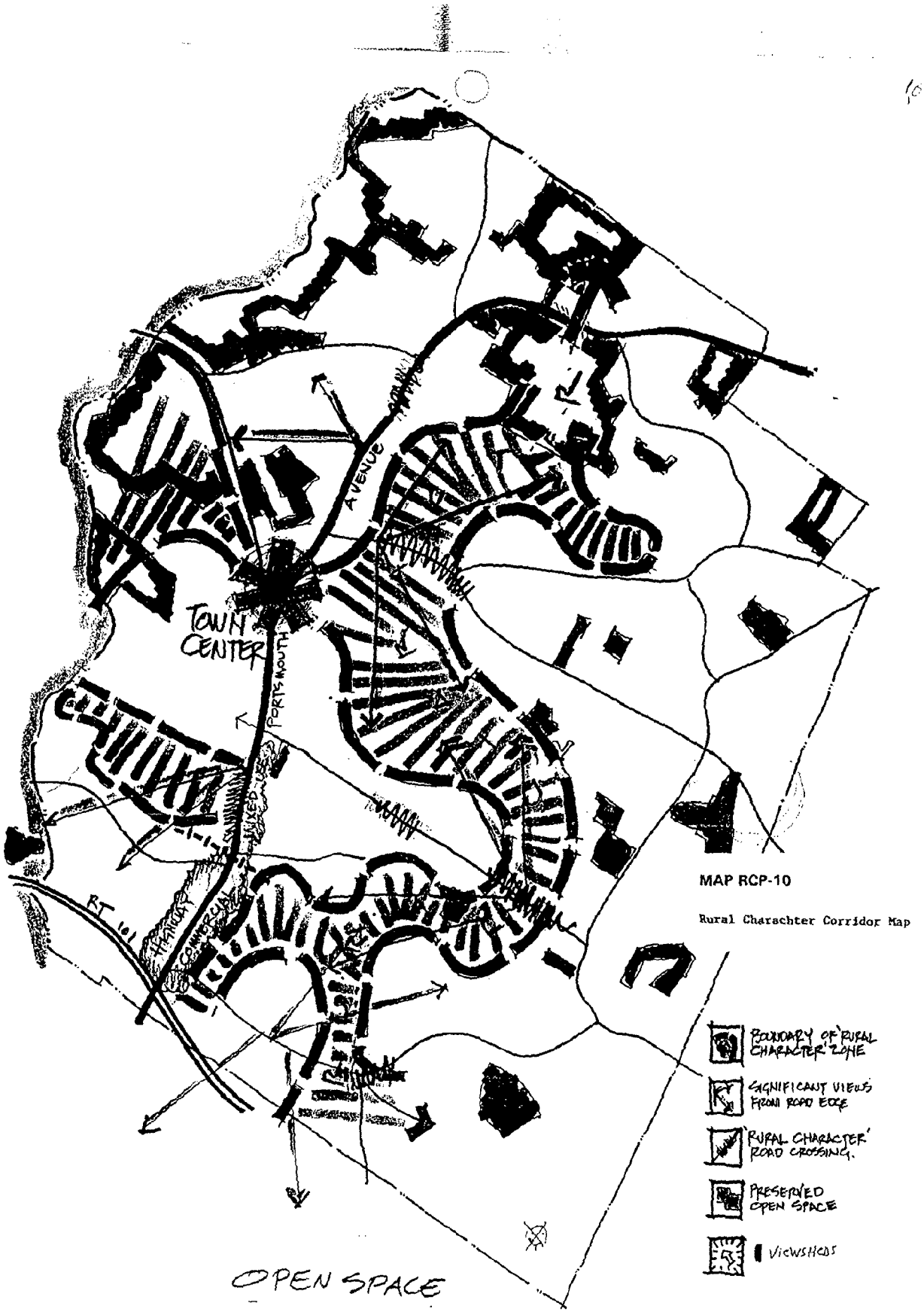
"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data."

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

Conservation lands from GRANIT. As of November 1995, a digital record of parcels of land of two or more acres that are mostly undeveloped and are protected from future development were mapped. Sources included: Society for the Protection of NH Forests records, records from various state agencies, aged original deeds and tax maps. There is also an associated data file that contains information on the lands.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA47020237.

Prepared by the Rockingham Planning Commission June 12, 1996 RPC



MAP RCP-10

Rural Charachter Corridor Map

5.0 HISTORIC RESOURCES

5.1 A Brief History

Unlike its industrially-based neighbors of Newmarket and Exeter, Stratham was established primarily as an agriculturally based community located between the provincial capital of Exeter and the seacoast port of Portsmouth. The first settlement occurred in the vicinity of Sandy Point under the Captain Thomas Wigging in 1640. The Squamscott Patent contained the east side of the Squamscott River and Great Bay and was divided in 1656 into three shares by the authority of Massachusetts. Wigging controlled the middle and southern sections which later became Stratham. Originally part of Hampton, the Squamscott Patent was assigned to Exeter in 1692. By 1703, the Town had 35 families. They petitioned to establish the Town of Stratham and indicated a willingness to maintain a minister and schoolmaster, a common requirement in the days before the separation of church and state. Thus, in 1716, the Town of Stratham was created, having 15.81 square miles or 10,124 acres in area. Two small parcels of land were ceded to Greenland in 1805 and 1847.

The first legal town meeting was on April 10, 1716. The first vote after the election of town officers was to appoint five individuals "to be a committey to take care to build a meeting house for the public worshipe of God in said Town". (FN) The first meeting house was built in 1718. It was replaced by a new meeting house in 1768, and again in 1837 by a third meeting house on the same site.

The agricultural land in Stratham was important to both the settlers and the native Americans who inhabited the area. The early settlement history shows a pattern of cooperation between the two groups. Significant agriculture-related industry developed along the arterial waterways. Sawmill Brook supported at least three mills: a sawmill, grist mill and cloth mill. In addition to the same type of mills, along the Winnicut River there was a starch mill. Until 1952 the Jewell family operated the "oldest operating grist mill in the State of New Hampshire".

Taverns flourished for both travelers and residents along the Kings Highway which linked Exeter and Portsmouth. At least three former taverns still exist: the Chase Tavern on Emery Lane, the Kenniston Tavern on Portsmouth Avenue and the corner of Depot Road and the Peabody House on Winnicut Road. The Legards' house on College Road also may have once served as a tavern.

5.2 National Register of Historic Places Designation

The National Historic Preservation Act of 1966 authorizes the Secretary of the Interior to maintain a National Register of Historic Landmarks and Places. Within Stratham, there are no historic districts, however there are several buildings listed in the National Register of Historic Places. Most recently, on December 10, 1993, the Wigging Memorial Library building was included on this register. The Wiggin Library joins the Samuel Lane House, located at the traffic circle, the Kenniston Tavern and the Tannery (Widow Sarah Wiggin House), both located at the corner of Portsmouth Avenue and Depot Road. Appendix A, prepared by Stratham Historical Society volunteers, includes a list of over 80 historic sites. These sites are depicted on **Map RCP 11.**

Research conducted by the Natural/Historical Resources Issue Group in connection with the Stewardship process identified a number of homes in the Union Road/Winnicut Road area of Stratham. There are ar least six homes which

are eligible for listing on the National Historic Register. Of those eligible, three are over 200 year old and three are over 100 year old. The Town could begin a modest effor to protect some of its historic strucutres by establishing an historic district on Winnecut Road from Union Road to the North Hampton line. Inquires made of homeowners by the Issues Group found little opposition to the idea of creating an historic distric in this area. Prior to taking this step, the Town should undertake an inventory of the proposed district's structures noting the architectural significance of each.

5.3 Archeological Sites

In addition to historic structures New Hampshire contains a wide array of archeological sites worthy of protection. Such sites contain the unique record of human achievements spanning well over 10,000 years of history and are irreplaceable. This period spans the age from the first occupation after the retreat of the glaciers (at the end of the Ice Age) through the displacement of the Native American Indian culture by European explorers and colonialists. Archeological sites are the only sources of information about the Native American cultural tradition. For the historical period of the Euro-American cultural tradition, archeological sites provide an important dimension for the understanding of history. Archeological sites may balance, expand, corroborate, or contradict the written and oral record of history and, together with our architectural heritage, provide physical reminders of the past. In Stratham , two sites of particular value include the Town Landing at Sandy Point, which was the 1633 landing site of the first Colonial settlers, and the Thomas Wiggin gravesite, located about 500 yards west of the old Depot on the south side of the railroad tracks . Thomas Wiggin was the first European settler in Stratham.

Two preliminary excavations have been conducted at the Sandy Point site. A house foundation and colonial artifacts have been found at the contact site adjacent to the Thomas Wiggin gravesite and Wiggin Cemetary. The second dig on the far side fo the railroad tracks showed evidence of early use by maritime archaic peoples.

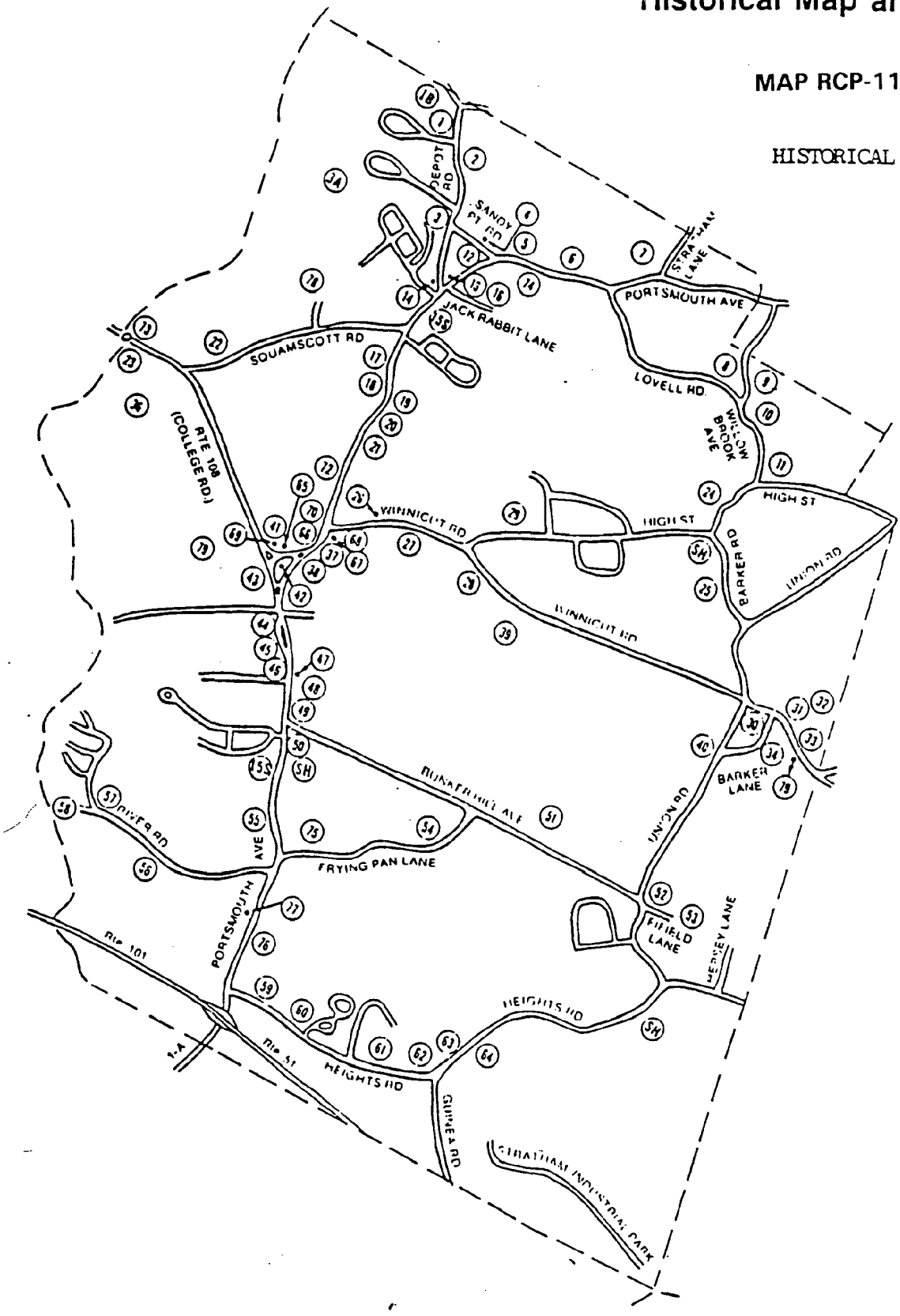
Generally speaking, prehistoric sites are most likely found in areas with the following characteristics: proximity to water (both potable water, and waterways for travel); sandy and gravelly well-drained soils; level ground; exposure; proximity to raw material sources (especially suitable rock for the making of tools), and; proximity to food sources (such as estuarine environments for shellfish beds, falls and rapids for restricting the passage of anadromous fish, freshwater marshes and thickets for other shellfish and small game).

The primary investigators of Stratham 's archeological history are Gary Hume, NH State Archeologist, and the Stratham Historical Society. According to studies completed to date, there are at least 3 or 4 significant prehistoric sites which have been recorded in Stratham. One site is the one previously mentioned at Sandy Point;. A second is located in the vicinity of the confluence of Jewett Hill Brook and the Squamscott River, where a preliminary excavation is tentatively scheduled for the summer of 1997. Another identified site is near the confluence of Mill Brook and the Squamscott River. According to the State Archeologist, these sites were used as semi-permanent villages or seasonal camps by Native Americans and are probably about 1,000 years old. Any further archeological findings would likely be located in close proximity to the Town's waterways. It is likely that the majority of identified sites are from the period before European settlement, however, there may be several sites which date back to prehistoric times. Items commonly found at the Town's various archeological sites include: fire hearths, tools, arrowheads, pottery, and old structural foundations.

Historical Map and Notes

MAP RCP-11

HISTORICAL MAP



There is a notebook at the library with additional information about the historical places designated on this map. We hope you will look at it and if you have any information you would like to share, feel free to write it down the book.

ENJOY!

The Stratham Historical Society.

1-A. Portsmouth Ave. - That part of the road in Stratham was laid out in its present form in 1681 and was known as the "King's Great Highway." Stratham was incorporated as a town in 1716.

1-B. Thomas Wiggin Gravesite - Thomas Wiggin was the 1st settler in Stratham. He built a house in 1639. A few years before his death he deeded all his land to his son Andrew. Andrew, in turn, sold or gave a portion to his brother Thomas (3) and they both made their homes here.

1. Richard Wiggin - Depot Rd. - ca. 1767 - Tuftin & Saran Wiggin to their son, Richard, land & "½ of my cowpen marsh."

2. Thomas (3) Wiggin - 38 Depot Rd. - In 1727 this house was willed by Thomas (3) to Tuftin (4), his son.

3. Thomas Foss - ca. 1761-69 - on land from his father. House was moved to its present site on Depot Rd. from 3-A by James Diman.

3-A. Original site of Foss House.

4. Timothy Murry - ca. 1745 - 10 Sandy Point Rd. He was a cooper (barrel maker) from Newmarket, N.H. House was originally two rooms.

5. Francis & Eleanor Durgin - ca. 1726-30 - Portsmouth Ave.

6. Samuel Allin - before 1737 - Portsmouth Ave. In 1772 was bought by Samuel Piper, father of John who lived in house #4.

7. Saltbox Farm - Portsmouth Ave. - Thomas Wiggin ca. 1725. Retains his original lines and its builder was a direct descendant of Gov. Tho. Wiggin.

8. 57 Lovell Rd. - J. Lucy House - on 1793 map.

9. High St. - Capt. J. Avery House - on 1793 map.

10. Otis French - 1873 - 91 Willowbrook Ave.

10-A. Barn across the street was built in 1865. At one time it contained a cider mill and a chair factory.

11. B. Wiggin owned this house in 1793 - did not live in it then. Corner of Willowbrook and High St.

12. Andrew Wiggin - ca. 1749-60 - Portsmouth Ave.

*13. NRHP House - Coronet Thomas Wiggin - ca. 1762 -Portsmouth Ave.

*(National Registry of Historic Places)

*14. Ephraim Crockett - before 1768 - NRHP House. Known as "The Kenniston Tavern" - Portsmouth Ave.

15-S. Sites of two original schools - Portsmouth Ave. The other site is approx. ¼ mile south of Bunker Hill Ave. on the northerly side.

16. Josiah Brown - 1816. He wrote in his diary that he "tore the old house down, and raised a new one in 1816." Jack Rabbit Lane.

17. Portsmouth Ave. - Heirs of J. Folson owned house on 1793 map.

18. Portsmouth Ave. - Samuel Lane built this house for his son ca. 1760.

19. Charles Wiggin - ca. 1726-40 (yellow clap) Portsmouth Ave. He inherited the land in 1726 from his father's estate - was a carpenter.

20. Bradstreet Wiggin ca. 1705 built back ell of the house. It was a tavern in 1706. In 1810 Aaron Jewett built the large front portion (the "colonial") - 218 Portsmouth Ave.

21. Joshua Hill ca. 1725. 200 Portsmouth Ave. He bought 30 acres of land from Jonathan Wiggin. He was a carpenter and probably built his own house.

22. 66 Squamscott Rd. - Andrew Wiggin, son of Gov. Thomas Wiggin, built the ell at the back of the house - possible dating back to the 1600's. The large front portion of the house was built by Caleb (5) Wiggin. Caleb thought to have built #49.

23. Jonathan Wiggin ca. 1720 - He had a tavern here in 1721. College Rd.

24. High St., N. Barker House on 1793 map.

25. Barker Rd., Ezra Barker House on 1793 map.

25. Winnicut Rd., Capt. J. Wiggin House on 1793 map.

26. Winnicut Rd., Andrew Wiggin IV was living here in 1793.

28. Winnicut Rd., Nan Wiggin House on 1793 map.

29. High St., Capt. J. Wiggin lived here in 1793.

30. Thomas Veasey - ca. 1720 - Union & Winnicut Rd. This has kept its original architectural style and is believed to have been a stop on the underground railroad.

31. Winnicut Rd., S. Piper was here in 1793.

32. Winnicut Rd., S. Piper was here in 1793.

33. Capt. D. Jewell lived here in 1793. It was a tavern at one time. 173 Winnicut Rd.

34. Barker Lane - Dr. M. Clark lived here in 1793.

35. Blank

36. On the Stuart Farm (off College Rd.) Built by Simon Wiggin. S. Wiggin Esq. living here in 1793.

37. 156 Portsmouth Ave. - Rev. J. Mittimore House in 1793.

38. Portsmouth Ave. - S. & M. Thurston House in 1793.

39. Nathan Hoad lived here in 1793 and possibly was the first person to occupy the house. Winnicut Rd.

*40. Union Rd. - T. Smith Esq. owned this house in 1793.

41. The Commons - Col. H. Rust lived here in 1793.

42. Jabez Lane in 1806. Built on site of homestead of his father Samuel Lane. Or NRHP - in Stratham Circle on Portsmouth Ave.

43. Andrew Lane - ca. 1820 - 129 Portsmouth Ave. He was a son of Jabez Lane who built #42.

44. Hon. P. Wingate Esq. - before 1793. The barn is still standing - the original house which burned down was built on the site of the Moses Leavitt [illegible] Emery's Lane.

45. Congregational Church - Emery's Lane. This church dates from the [illegible] of the town charter. It's first house of worship being built in 1718. This was replaced by a new building in 1766 and by the present one in 1837. All occupied the same spot. A town cemetary is next to it.
Baptist Church - ca. 1840 - moved in 1983 to its present location next to Cong. Church. The original site (#72) on Portsmouth Ave. has stones marking off the foundation. One of the two town cemetaries is next to it.

46. David Hannford - ca. 1738 - known as Chase's Tavern. The first town meeting was held here. Emery's Lane.

47. George Veasey - ca. 1741-59. Portsmouth Ave.

48. J. Wingate House in 1793. Portsmouth Ave.

49. T. Veasey Jr. House in 1793. Said to have been built by Caleb Wiggin (Built front part of #22). It was a parsonage at one time, then a house of "ill repute."

50. Corner of Portsmouth Ave. and Bunker Hill. Benjamin Leavitt first had a house here - ca. 1709-33. Present house was the Bartlett Homestead in 1850.

51. Bunker Hill Ave. - J. O'Del House on the 1793 map.

52. Built by David Robinson after 1717. In 1769 David Robinson's will gave "all my land and buildings in Stratham to my great grandson, David Wiggin." The family still lives in the house - corner of Union Rd. and Bunker Hill Ave.

53. Fifield Lane - Col. Fifield House on 1793 map.

54. Frying Pan Lane - M. Chase House on the 1793 map.

55. Col. E. Ladd owned this house in 1793 but did not live here.

56. River Road - Richard Scammon, ca 1836.

57. Richard Sinclear (Sinkler) ca. 1728 - on land left to him by his father, James. River Road.

58. The Town Landing.

59. Heights Rd. - J. Clark lived there before 1793.

60. Heights Rd. - J. Rundlett lived there in 1793.

61. 25 Heights Rd.

62. 67 Heights Rd.

63. 83 Heights Rd. - Folsons (1892).

64. 94 Heights Rd. - ca. 1783, Jo Stevens.

65. Town Hall - built 1876-77.

66. Post Office - Stratham's first post office was on the corner of Portsmouth Ave. and Winnicut Rd. where the First Savings & Loan Bank now stands.

67. Wiggin Library - present building given to the town by George A. & Emma B. Wiggin. Tradition says the town received a library as a gift when town was chartered. The first recorded library was started Dec. 10, 1793 and was kept at John Dearborn's house on Bunker Hill Ave. (area of Holmgren Rd.)

68. Fire House - Fire Dept. Started in 1951 and is a completely voluntary organization. An ambulance was acquired in 1984.

69. Site of the old car barn. Now Cadieux's. Trolley cars were kept here when they were running between Portsmouth and Exeter.

70. The Elms - 1875. A great resort hotel in its day, partly due to the "wonderful, curative properties" of the sulphur well. Portsmouth Ave.

71. Sulphur Springs - ca. 1879. A "sulphur well" in back of the Elms. Water was bottled and distributed all through New England. "A cure for many ailments."

72. Original site of Baptist Church. Moved in 1983.

73. Toll Bridge - Rte. 108 between Stratham and Newmarket. Construction began in 1768 - finished approx. 1775. Each person was charged 2¢ to cross while a person with a horse paid 6¢. It is now known as the Singing Bridge because of the noise that is heard when driving over it.

74. Stratham Hill Park. Given to the town by Edward Tuck of Paris, France in 1905. In memory of his father, Amos, a citizen of Exeter. There was an active fire look-out tower on top of the hill for many years.

75. Frying Pan Lane - According to tradition the one frying pan was shared by all and circulated up and down the road.

76. J.N. Thompson House in 1852. Portsmouth Ave.

77. Jewett House in 1852. Portsmouth Ave.

78. Col. J. Robinson House on 1793 map. Squamscott Rd.

79. Grist Mill Sites. The Winnicut River supported 5 mills in Stratham - 3 grist mills, a saw mill and a shingle mill.

SH. School House. The first two schools were built in 1733. Two additional school sessions were held beginning 1739 but the two additional schools were not built until 1761.

6.0 RECOMMENDATIONS

It is a fundamental goal of the Town of Stratham to conserve and protect its natural resources, important agricultural land and other open spaces, as well as historic buildings and sites. To attain this goal both now and in the future, the following policies are established and recommendations made.

6.1 General

It is the policy of the Town of Stratham through both regulatory and non-regulatory means, to limit and control development in environmentally sensitive areas, including, wetlands, floodplains, aquifer recharge areas, steep slopes, and areas unable to support on-site sewage disposal.

Recommendations

1.1 The Planning Board should continue to review and carefully consider resource information pertaining to soil, slope, wetlands, floodplains, and other natural resource and historic resource information as part of its planning and development review.

1.2 The planning board should continue to require site specific research, analysis and mitigation of specific environmental concerns whenever a proposed development appears to impact environmentally sensitive areas.

1.3 The Conservation Commission should review, evaluate and provide recommendations regarding all development proposals or activities that appear to negatively affect the Town's natural resources and environmentally sensitive areas. They should communicate their concerns and recommendations to the Planning Board, Zoning Board of Adjustment, Board of Selectmen, N.H. Wetlands Council or other body as appropriate.

1.4 The Planning Board to should amend the appropriate section of the subdivision and site plan review regulations to require applicants to meet with the Conservation Commission to review development proposals went such development is likely to have significant resource impacts. Further, the Planning Board should seek the advice of the Conservation Commission whenever such development proposals are reviewed.

1.5 The Planning Board should continue to periodically review and recommend changes, as needed, in the Zoning Ordinance, Subdivision Regulations and Site Plan Review Procedures to be consistent with this policy.

1.6 The Planning Board should review existing open space provisions of the Town's Cluster Development Ordinance to ensure that it creates useable, valuable and well planned open space in cluster developments.

1.7 The Conservation Commission should review and provide comments to the Planning Board on the proposed open space components of all cluster developments.

1.8 The Planning Board should consider ways to increase the amount of useable open space set aside in residential development and make adjustments in zoning provisions as appropriate.

6.2 Natural Resources

It is the policy of the Town of Stratham to protect its natural resources both for the health and enjoyment of the residents and for the health and well being of the environment.

2.1 The Town should maintain its commitment to protect saltmarshes, vernal pools, other important wetlands, ponds, streams, and any rare- and threatened-species habitats through the following means:

-- Inventory, map and prioritize wetlands resources and pursue prime wetlands designation for critical wetlands important to wildlife and natural processes;

-- Increase public holdings, easements and restrictions on wetlands by public and private entities, with specific concentration on the Sawmill Brook and Winnicut and Squamscott River corridors

-- Work with federal, state and other applicable local and/or non-profit agencies to implement and enforce regulations relating to wetlands protection

-- Work with the Army Corps of Engineers and other applicable agencies in securing funding and restoration plans salt marsh restoration, located along the Squamscott River

--: Develop guidelines to ensure effective and timely communication and interaction among Town agencies and officials on wetlands issues

-- Review Town zoning ordinance, including wetlands, floodplain and shoreland protection ordinances for effectiveness and consistency with enabling legislation

-- Develop public education programs on wetlands and critical habitats

2.2 The Planning Board should establish reasonable limits on the cutting of timber on parcels being prepared for construction.

2.3 The Conservation Commission should work with the Stratham school teachers, administrators and school board members to assist in environmental education programs to increase awareness of environmental issues specific to Stratham.

6.3 Water Resources

It is the policy of the Town of Stratham to vigorously protect the quality and quantity of the Town's surface and groundwater resources to ensure present and future water supplies for the Town and to protect the health, safety and welfare of its residents. It is further the policy of the Town to seek to prevent all pollution of surface and groundwater

and to enforce all ordinances pertaining to on site water sources and sewage disposal systems.

3.1 The Town should continue to provide on-site inspections of all subsurface system siting and installation by qualified personnel.

3.2 The Planning Board should consider proposals incorporating new technology for limited private water and sewer systems in new developments or developments needing to address problems in keeping with New Hampshire WSPCD standards.

3.3 The Planning Board should research and implement appropriate amendents the Aquifer Protection District to limit and control the volume of water withdrawal for private commercial or utility purposes.

3.4 The Town should strictly enforce the sand and gravel excavation provisions of the Aquifer Protection District to prevent contamination of aquifers due to excavation site activity.

3.5 The Town should investigate and carry out the steps necessary for the Town to secure public water supply franchise rights within its jurisdiction.

3.6 The Town should acquire land or development rights to key parcels, if needed, to protect future town water supplies. Such acquisitions should integrated with Townwide open space protection efforts.

3.7 The Town should pursue long term agreement with the Town of Exeter regarding further access to the Exeter sewer system for future development in the Industrial, Office Research and General Commercial Zones.

3.8 The Town should seek to limit the amount and frequency of the use of salt for winter deicing of roads, especially within the aquifer protection district. The Town should work with the NHDOT District VI to implement this policy on State roads.

3.9 The Town should continue to participate in and actively promote regional household hazardous waste collections to encourage safe disposal of hazardous materials.

3.10 The Town should maintain its commitment to the Wellhead Protection program and support adequate ongoing site monitoring and landowner education efforts.

3.11 The Planning Board should periodically review and update the Water Resource Management and Protection Plan.

3.12 The Planning Board should review the requirements and standards of the Stratham Shoreland Protection District against those of the State Comprehensive Shoreland Protection Act (RSA 483-B) to assess consistency and eliminate redundancy between the two regulations.

6.4 Open Space and Conservation Lands

Recommendations

It is the policy of the Town of Stratham to protect Stratham's natural resources, agricultural land and other open spaces by securing the development rights to important open space and conservation lands.

4.1 The Town should continue to support current use assessment as a cost effective means of encouraging the private preservation of open space, forested and agrciultural lands.

-- the Town should take steps to inform landowners about the availibility of the program;

-- current use land conversion penalty fees should be set aside for future open space and conservation land protection.

4.2 The Conservation Commission should update and maintain the inventory of conservation and open spece lands prepared for the 1989 Open Space Plan and further identify and prioritize critical lands in private ownership that should be protected from development.

-- The Conservation Commission should take the lead in preparing an updated Open Space Plan which should include a prioritized list of open space parcels (including parcels within the "S" shaped area identified in the 1996 Community Stewardship process (see Map RCP 10). Open Space priorities should address sensitive environmental areas and habitats, shoreland areas, recreational trail networks, wildlife corridors, and scenic areas.

-- The Conservation Commission should develop and specific land protection strategy and plan that will result in the acquisition of development rights for high priority conservation and open space lands. The Commission should seeks assistance in this effort from the Rockingham Planning Commission, the Society for the Protection of NH Forests, the Trust for Public Lands, the Rockingham Land Trust or other groups.

-- The Conservation Commission should actively pursue outside funding and acquisition options with which to acquire development right to important open space lands, and should encourage the State Legislature to fund the Agriculture Land Protection Program.

4.3 The Town should fund a land stewardship program to purchase development rights for the highest priority open space and conservation lands identified in the updated Open Space Plan. Whereever feasible, the acquisition of development rights should be done with the objective of keeping existing forest and agricultural land in productive use.

4.4 The Conservation Commission should develop landowner education program and provide information on conservation easements, estate planning and best management practices to property owners who hold large undeveloped parcels.

4.5 The Town should support and participate in regional efforts to identify and protect open space and trail networks and wildlife corridors, including efforts by the Great Bay Estuary Estuarine Research Reserve, SPNHF

and the Rockingham Land Trust.

4.6 Encourage the use of cluster development techniques for future residential development by reducing the minimum parcel size eligible for utilizing the single family cluster development provisions of the existing ordiance.

6.5 Agricultural Resources

Recommendations

It is the policy of the Town of Stratham to protect Stratham's agricultural resources by securing development rights and by promoting conservation measures and best management practices.

5.1 The Town should support renewed funding of the State's program to preserve important agricultural land through the purchase of agricultural development rights and seek support from other communities in the region to support such efforts.

5.2 The Town should consider funding and purchasing agricultural development rights for key agricultural lands as part of its open space protection efforts

5.3 The Conservation Commission should contact all remaining farmers and agricultural property owners in the community to determine what actions the community could take to enhanse the viability of agriculture in Stratham and make recommendations to the Town accordingnly.

5.4 The Planning Board review the Zoning Ordinance and possible alternative to enhance the protection of important farmland either through a separate zone or specific site criteria and recommend changes, as appropriate.

5.5 The Town should promote and support the establishment of a farmer's market in Stratham in a commercially attractive location to help create new markets for locally grown agricultural products.

6.6 Historic and Archeological Resources

The historic and archeological building and sites in Stratham contribute to the Town's unique heritage, and thus it is in the public interest to protect them. It is the policy of the Town of Stratham to protect these historic and archeological resources through both voluntary measures and regulatory powers.

Recommendations

1. The Historical Society should update and expand the 1985 map and inventory of all public and private landmarks including areas, sites, and existing buildings. The inventory should be expended to include (1) all known archeological sites, (2) an archetecural survey of the communities historic structures, and (3) the identification of which buildings which may be eligible for inclusion on the National Register of Historic Places.

2. Following the update and expansion of the 1985 inventory, the Planning Board should pursue the recommendation made during the Community Stewardship process and propose an historic district overlay zone along Winnicut Road from Union Road to the North Hampton town line.

3. The Town should take positive steps to ensure that known and undiscovered archeological sites are not accidentially disturbed or destroyed by site excavation for development. These steps should include:

   -- The Historical Society should request information from the State Archeologist's office and become informed about the areas and sites where archeological sites are likely to exist. This information should be compiled and provided to the Planning Board for reference.

   -- The Plannig Board should develop provisions in the subdivision and site plan regulations applicable to developments proposed in known or suspected archeological sites. These provisions should address notification of the State Archeologist and secure permission to conduct a timely site reconnaisance of sites prior to excavation;

   -- Thw Town should include rights for archeological investigations for any conservation easement it obtains on lands where there is reason to suspect the presence of an archeoplogical site.

4. The Town should foster an increased awareness and appreciation of the history of Stratham and its historic and archeological assets through public education.

   -- The Historical Society should continue to offer periodic lectures and develop public displays;

   -- The Historical Society should develop school-oriented materials about Stratham's history and make those materials available to the school;

   -- The Historical Society should update and republish the *Town History*.

STRATHAM MASTER PLAN

2. RECREATION CHAPTER

RECREATION CHAPTER

(Revision Date: August 10, 1996)

Chapter Outline

RECREATION CHAPTER

1.0 INTRODUCTION

Located in the coastal region of New Hampshire, Stratham is home to a number of recreational facilities which are heavily used by local residents and also those of abutting communities. Stratham residents are active participants and volunteers in the many programs offered through the Town's Recreation Department, particularly the youth team sports leagues. Outdoor facility needs for these sports (i.e. ball fields and soccer fields) have been met to date through the multiple use of all available field space. Baseball outfields, for example, become soccer fields depending on the season. Due to the availability of only one gym in town, indoor sports facility space and time is limited. Individual recreation needs (fishing, hiking, etc.) are met through the availability of Town and State owned boat launches on the Squamscott River, hiking trails throughout town, and a variety of programs available through the Recreation Department. In addition, many residents are able to take advantage of nearby regional recreation opportunities such as swimming and picnicking at state beaches, boating/fishing in Great Bay, or skiing and hiking in the nearby White Mountains.

The importance of recreation to general health and quality of life in a community is widely accepted. Recreational opportunities including organized group sports and activities, as well as passive outdoor recreation contribute to individual enjoyment and education, and perhaps most importantly, to the sense of community in Stratham. As the residential population grows, the Town will need to enhance its commitment to recreation by maintaining the quality of and access to all its existing facilities and programs and by expanding them as needed to accommodate growth.

2.0 RECREATION COMMISSION

Stratham maintains a Recreation Commission and Recreation Department to oversee Town sponsored recreational activities and facilities. The Recreation Commission's mission is to provide "the residents of Stratham the opportunity to participate in varied activities including, but not limited to, team sports and individual athletics (i.e. aerobics, skiing), dances, special events, roller skating, etc." The Recreation Commission is dedicated to promoting fellowship, spirit, and good will in the Town of Stratham through the dedication of volunteers who organize events, scheduled on a year round basis and available to all ranges of age and ability.

Members of the Recreation Commission (5 regulars and 2 alternates) are appointed by the selectmen and serve on an unpaid, volunteer basis. Members usually include the heads of each of the different youth team sports leagues. The Commission overseas not only the organization of these leagues, but many other programs available to residents. In 1995 adult programs in basketball, volleyball, aerobics and exercise programs were offered. In addition, the Recreation Commission sponsors a summer camp program for elementary school children, senior citizen bus trips arranged through the Stratham 76ers Club, dance classes, monthly family roller-skating, an annual preschool/primary grades Easter egg hunt, a sixth grade graduation dance, as well as other varied activities (family ski trips, family swim nights, bus trips to the Portland Seadogs Baseball game, etc.)

The Recreation Commission organizes a highly successful volunteer youth sports program. According to statistics recently compiled by the Commission, and shown below in Table R-1, there were more than 1200 participants in the

youth sports programs in 1996. This represents about a 45% increase just since 1992-- a period when the Town's population grew by less than 10%.

TABLE R-1 -- LEVELS OF PARTICIPATION IN YOUTH RECREATION ACTIVITIES

Activity	Number of Participants				
	1992	1993	1994	1995	1996
Soccer - Girls and Boys (Ages 6-14 years)	365	388	400 +	420	440
Basketball- Girls and Boys (Ages 7-12 years)	208	200 +	200 +	200 +	200 +
Basketball - Girls and Boys (7th and 8th Grade)	NA	NA	30 +	30 +	30 +
Baseball - Girls and Boys (Ages 6-14 years)	290	321	350 +	380	400 +
T-Ball - Girls and Boys (Age 6 years)	NA	50	50 +	50 +	50 +
Babe Ruth - Boys (Ages 13-15 years)	NA	30 +	30 +	35 +	40 +
Summer Program (Grades 1-7, Boys and Girls)	NA	80 +	70 +	75 +	75 +
Total Participation	**865**	**1069 +**	**1130 +**	**1190**	**1235 +**
Source: Stratham Recreation Commission					

As indicated, there has been a steady and significant increase in participation within Stratham recreational programs in the past 5 years. While participation has increased, funding has also increased, as indicated on the following chart, compiled from Annual Town Reports from 1986 to present

TABLE R-2 -- ANNUAL BUDGETS FOR TOWN RECREATION ACTIVITIES

Fiscal Year	Parks and Recreation Department Budget	Recreation Commission
1986	$20,900	$14,800
1987	$20,200	$17,160
1988	$20,450	$17,836
1989	$21,360	$24,245
1990	$20,825	$24,140
1991	$23,060	$27,855
1992	$20,154	$28,650

1993	$24,860	$40,800
1994	$25,060	$30,100

As in many smaller communities, programs offered through Stratham's Recreation Department are largely a volunteer effort. There are no permanent part or full-time employees, although there is some paid staff for the summer camp programs. Many of the volunteers have become involved due to the fact that their children have participated in the various school age programs which the Recreation Committee offers. The importance of this volunteer spirit to our residents' overall positive sense of community was strongly reaffirmed during the 1996 Community Stewardship Program.

Due to their volunteer makeup and self supporting structure, the recreation programs in Stratham are very flexible and able to respond to the changing interests and desires of the community. Residents can use the structure and support of the Recreation Department to create any new programs that they would like to see offered with guidance from the committee regarding appropriateness of the activity, and time and space availability. Most programs are financially self sufficient with registration fees offsetting the costs of regular operations and equipment. Major facilities upkeep is an exception with these costs reflected in the Recreation budgets shown above.

The issues of time and space availability of facilities are major responsibilities of the Recreation Committee. It coordinates access, meaning both scheduling and, in some cases, maintenance (i.e. mowing and irrigation), for our residents to in-town facilities which are owned by at least three different bodies - The State, the Town and the School Department. To accomplish this, the Recreation Department maintains close interrelationships with the selectmen and Highway Department, the School Board, Stratham Hill Park Association, the NH Technical College, and many other related organizations.

3.0 EXISTING RECREATIONAL FACILITIES

Stratham has a number of outstanding recreational facilities which accommodate activities as diverse as outdoor and indoor team sports, hiking, boating, picnicking, to name a few. The following is a description of the main facilities in the community that are used for recreational purposes. The list includes facilities owned and controlled by Stratham as well as others which the Town "hosts". A list of recreation land owned by the Town, School, State or other groups is provided on **Table R-2**. The location of each of the recreational facility sites is shown on **Map R-1** -- ***Recreational Facilities Map.***

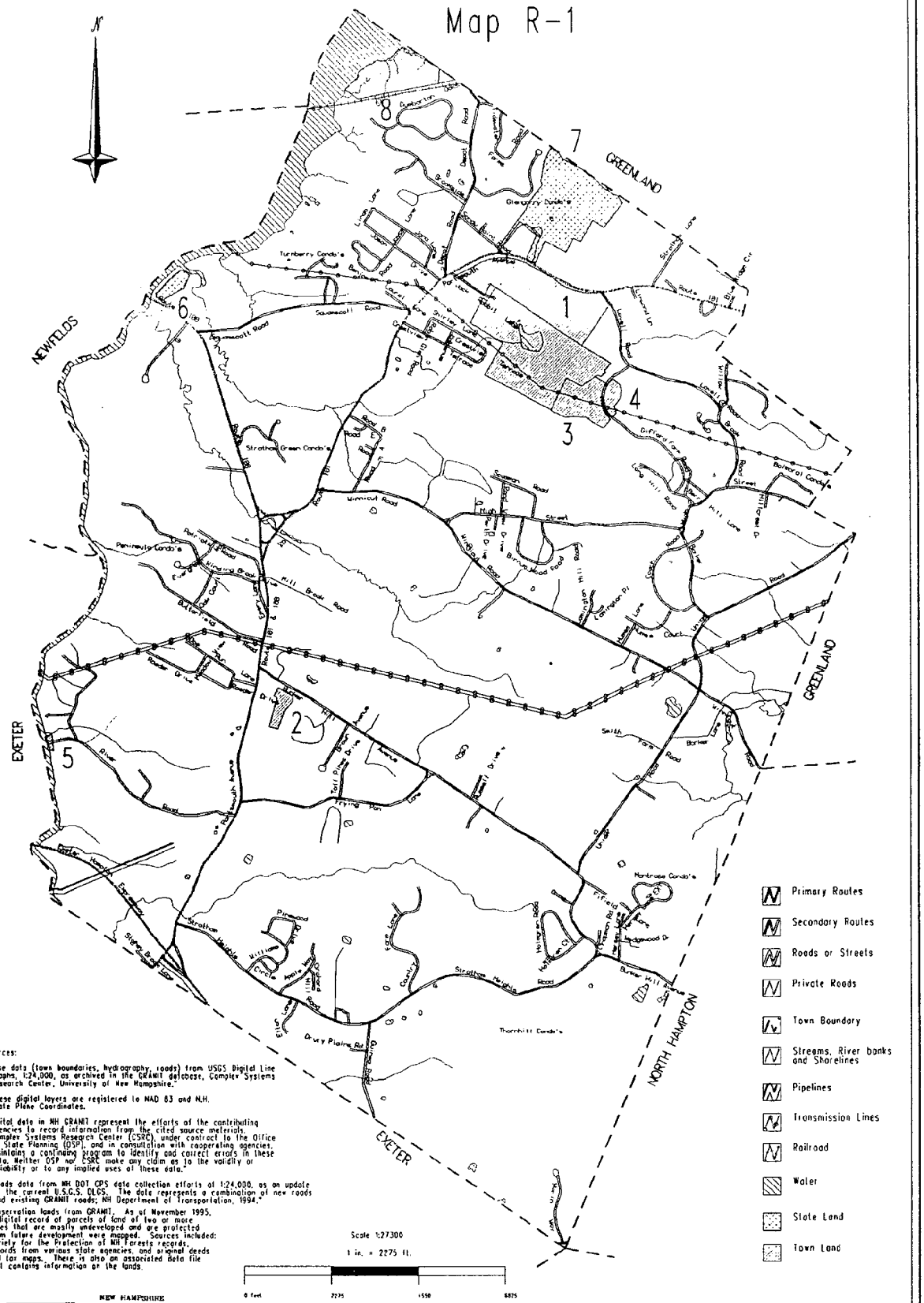
Town-Owned Facilities

Stratham Hill Park

Stratham Hill Park is the centerpiece of all of Stratham's recreational facilities. Given to the Town in 1905 by Edward Tuck of Paris, France for one dollar, the park originally contained 70 acres "more or less". (FN) The 1905 deed said in part:

> "The conditions of this conveyance are that the trees upon said land shall be preserved, with additions and renewals from time to time, and that the property be maintained in at least as good condition as in the past for the free use and enjoyment of the people of Stratham, Exeter, Portsmouth and other adjacent towns for all time,

Stratham, N.H.
Recreation Facilities
Map R-1



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data."

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

Conservation lands from GRANIT. As of November 1995, a digital record of parcels of land of two or more acres that are mostly undeveloped and are protected from future development were mapped. Sources included: Society for the Protection of NH Forests records, records from various state agencies, and original deeds and tax maps. There is also an associated data file that contains information on the lands.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by the Rockingham Planning Commission August 15, 1996 DRA

that no part of said premises shall ever be leased to private individuals or to corporations and that said premises shall be a public park and pleasure ground forever. The said town of Stratham to have control of said land with the power to make all necessary by-laws in regulating the use of the same, but no by-law shall be enacted depriving law abiding citizens from the above towns from the free use, enjoyment and occupation thereof. (FN2)"

The park was expanded in 1968 when the Town purchased about 38 acres from David C. And Elizabeth Noyes. The Noyes parcel came without any deed restrictions, and thus the use of that land can be limited to Stratham residents. The developed part of the 108 acre park contains: three ball field diamonds (60' base paths), space for two large soccer fields when baseball outfield areas are included (or potentially five junior soccer fields for primary grade use), one paved basketball court, a concert shell, a lighted, outdoor skating rink area, three pavilions with picnic tables, including one large pavilion with toilet facilities and nearby children's play equipment and a second pavilion with another playground area including swings and a slide, three concession/storage buildings, a horse pulling area, a natural amphitheater, two garage/storage buildings (a one bay and a two bay structure) , three 4-H buildings (two open stall animal pavilions and one large enclosed exhibition hall, a fenced corral near the middle of the 4-H buildings, a caretaker's residence, seasonal toilet facilities, and a large parking lot. There is a full-time caretaker who lives on the grounds.

The paved roadway winds through the Park accessing many of the buildings. A gravel roadway leads to the summit of Stratham Hill. The forested part of this part of the park contains Stratham Hill. For 40 years it was used by the State as a Forest Fire Lookout Station. The Fire Tower still remains and is an exciting and steep climb for many Park visitors. There is a coast and geodetic triangulation point at the tower and a table describing the view. Since the park contains the second highest hill in Stratham (elevation 286 feet), there are particularly scenic views of Great Bay and the surrounding communities.

The park is widely used as a recreation facility. Groups use the playing fields for youth and adult baseball, softball and soccer. Scheduling for the fields' use during prime sports seasons is handled by the Recreation Department. Numerous organizations and local companies use the whole facility for picnics, and recreation field days. Additionally, Stratham Hill Park has been used for wedding receptions, business outings, Cub Scout camp overnights, family reunions, birthday parties and a variety of other functions. Reservations for the free use of Stratham Hill Park are made through the Town Clerk's office, with functions often scheduled a year in advance. The number and variety of uses indicates that this facility provides regional recreational opportunities for area residents and is in keeping with the original intention of the Tuck gift. The park is well known for the three day Stratham Fair, which has been held annually, in July, since 1968. Proceeds from the Fair benefit of the Stratham Volunteer Fire Department, Stratham Hill Park and many other community groups.

The park is managed by the Stratham Hill Park Association, formed as an advisory group to the Board of Selectmen and incorporated with the State of New Hampshire in 1957. Any resident with an interest in the Park can become a member of the Association. This association oversees funds that have been donated to the Park Association for specific repairs and improvements and raises funds, through proceeds from the Stratham Fair and other events. Additional funds, such as those provided by the Federal Emergency Management Agency (FEMA), were used in August of 1991, when Stratham Hill Park was heavily damaged by a freak wind storm. Volunteer efforts, federal funds and other monetary and time contributions were made to rebuild pavilions, restrooms, and other areas damaged by the storm.

Gifford Farm Property

In 1985 the Town of Stratham voted to acquire the Gifford Farm, a 164.9 acre parcel, including a large farmhouse, barn and open agricultural land. The property abuts Stratham Hill Park and is located between Gifford Farm Road and Route 33/Portsmouth Avenue in Stratham. A portion of this property, 38.7 acres, was later transferred to the School Department in March of 1987 for the construction of Stratham's elementary school.

A trail system exists that connects the Gifford Farm parcel with trails through Stratham Hill Park and Stratham Memorial School. With approximately 120 acres of the original Gifford Farm land acquisition remaining, there is ample opportunity for new development of nature trails, and other active and passive recreational facilities and/or uses. Since the Town's acquisition of this site, the parcel's agricultural land is, when possible, leased for farming, the barn at one time was leased for equipment storage and the house has been rented and also was used for storage of historic documents. The proceeds of these activities have been used to maintain the farmhouse and barn on the property.

Stratham Memorial School

In September 1989 Stratham opened the doors to a new elementary school, converting the old school to house the current Municipal Center and the Wiggin Library. In addition to the construction of the elementary school classrooms and office areas, the building includes a large gymnasium with a full size basketball court and bleachers. The gym can also be divided by a curtain to provide two smaller basketball courts. Adjoining the gym is a large storage room and bathroom facilities, both of which also exit to the outside field areas allowing these two areas to be available on weekends, without opening the gym or the school, when the outdoor fields are being used. The gym is heavily used throughout the school year with physical education classes during the day, the S.A.F.E. after school day care program in the afternoons, and Recreation Department programs each weekday evening and all weekend long. Other indoor facilities in the school include a large cafetorium and stage. The stage is handicapped accessible and opens in the back to a multi-tiered music room which can serve as a back stage area for performances. Adjacent to the cafetorium is a large industrial kitchen. There is also an art room with a large kiln facility.

The outdoor field areas were built as multi-use fields. Included are two defined ball field diamonds (60' base paths) with backstops. The remaining field area has the ability to support at least one full size soccer field or up to 4 junior fields when outfield space is included. These field areas are heavily used throughout the year for physical education classes, recess space and Recreation Department sports programs taking place on weekday evenings and weekends. Due to this heavy use, a new well and irrigation system were recently added.

The outdoor complex also includes an outdoor basketball court, a physical fitness course of chin-up stations, overhead ladders, etc., and a large playground area, which was built entirely with volunteer efforts. The playground includes an extensive tire playground area with swings, climbing sections and rings and is widely used in the summer and after school for recreation.

Municipal Center

Converted to municipal offices in 1989, this former elementary school is located on a nine acre parcel close to the intersection of Bunker Hill Road and Route 108/33. In 1991 the Recreation Department, largely through

volunteer efforts, developed a regulation League sized softball field behind the municipal center. The field, named for Gail Binette, the former chairperson of the Recreation Committee, is heavily used by softball teams throughout the Spring and Summer and also accommodates junior soccer play in the Fall. A tire playground area built for the original school completes the site and is still widely used.

The Stratham Municipal Complex also contains a cafetorium with a stage and kitchen. Smaller in size than the school's, this area is a popular site used frequently by the Grange, the 76ers Club, the Boy Scouts, Recreation Department aerobic classes, as well as family anniversary parties and other functions and meetings. The annual Town Meeting and elections are also held in this room.

Town Landing.

The Town of Stratham owns a 1.5 acre parcel of land known as the Town Landing located at the end of River Road and abutting the Squamscott River. The site provides Stratham Residents with public access to the river, parking for several trailers and vehicles and an unpaved boat launching facility. Since the area is tidal, access and use are limited. The area was substantially improved in 1994 with assistance from the Boy Scouts by expanding the cleared area, and installing picnic tables and signs. The Town maintains the site.

Conservation Commission Land

The Conservation Commission oversees many acres of land, which are used for passive recreation, such as hiking, walking, bird-watching, and picnicking. The Stratham Conservation Commission either owns outright a number of these parcels of land which are open for public use or oversees conservation restrictions or easements for land protection on other properties.

Non-Town Facilities

New Hampshire Vocational Technical College

Located on Portsmouth Avenue, the state owned New Hampshire Vocational Technical College has several ball fields and soccer fields that it allows the Stratham Recreation Committee to use for its programs. The fields, located behind the school, include a hardball field (90' base paths), two softball fields (60' base paths) and two soccer fields. One soccer field overlaps with the softball fields, so all fields can not be used simultaneously. Also available in this location are several picnic tables and an outdoor fireplace near the college buildings. There is no inside recreation facility at the College. There are also no bathroom facilities. Although the fields are state owned, the Recreation Department controls the scheduling of the fields and arranges for their maintenance.

Chapman's Landing

Chapman's Landing is located on the Stratham side of the Route 108 bridge across the Squamscott River. It was originally acquired in 1984 by the State through funding from the U.S. Fish and Wildlife Service to provide a public access site for the river. The seven acre site was substantially upgraded in 1990 included a paved parking area, concrete boat launch ramp, and chemical toilet facility. A private residence adjacent to the parking area is currently held in a life trust and will one day become part of the public holding at the site.

Sandy Point Discovery Center

The Sandy Point Discovery Center, which opened in 1994, is an interpretative educational center occupying a 50 acre site along the Squamscott River on Depot Road. Designed as an educational resource for the Seacoast area, the Center consists of a building which houses displays and exhibits about the Great Bay and its ecology, a lab and training classroom, a car-top boat launch, as well as a self-interpretative trail and boardwalk crossing freshwater wetlands and salt marsh along the river. The site stratles the Stratham/Greenland town line, with the Discovery Center building located in Greenland, and most of the shoreland property in Stratham. The site was acquired with funds from the NH Land Conservation Investment Program (LCIP) and developed with support of the NH Coastal Program and Great Bay National Estuarine Research Reserve (GBNERR). The GBNERR staffs and runs the facility; it is open to the public and used extensively by local schools and organizations for environmental education.

TABLE R-3 -- STRATHAM RECREATION LAND MAP INDEX

Index #	Facility	Owner	Acres
1	Stratham Hill Park (Tuck and Noyes land combined.)	Town	108
2	Stratham Municipal Complex	Town	9
3	Gifford Farm	Town	126.2
4	Stratham Elementary School	Town/School District	38.7
5	Town Landing (River Road)	Town	1.5
6	Chapman's Landing (College Rd.)	State of New Hampshire	4
7	N.H.Technical College -- playing fields	New Hampshire Vocational Technical College	91
8	Sandy Point Discovery Center	State of New Hampshire (GBNERR)	50

Other Public/Private Facilities and Programs

Stratham residents have been able to use other area recreational facilities. In past years the Stratham Recreation Committee has offered tennis through Great Bay Tennis and Fitness Club, a private indoor facility located on Route 108 in Newmarket. The Committee has also offered swimming lessons at the indoor swimming facility at Phillips Exeter Academy, a private preparatory school located in Exeter. Other facilities at Phillips Exeter Academy such as the ice skating rink have been used as well.

Another recreational facility in Exeter used by Stratham residents and other members of Supervisory Union #16 is the Exeter recreation center located near the former County Courthouse building on Hampton Road. This facility, which the was built with federal funds includes six tennis courts, a basketball court, three baseball/soccer fields and an outdoor swimming pool.

Programs offered through the Exeter Recreation Department are also often available to Stratham residents on a space available basis. Exeter residents are often allowed an earlier sign up period and non-residents usually pay an increased program fee.

There are also a number of area recreational facilities, such as the Portsmouth YMCA that offer recreational programs and facilities on a regional basis. Individual and family passes are available for reasonable fees at facilities such as Phillips Exeter Academy, the Portsmouth Y, and numerous fitness clubs.

In past years the Boy Scouts and Girl Scouts have offered traditional programs, which have included nature and sailing programs. The 4-H club has also been available to those youngsters interested in a diverse number of activities, including but not limited to agriculture and farming.

4.0 ANALYSIS OF NEEDS

State Recreational Standards

The N.H. Office of State Planning has developed guidelines to assist communities in planning for their recreational needs. **Table R-4** below lists recreational facility standards as they appear in OSP's 1989 State Comprehensive Outdoor Recreation Plan. These standards were applied to Stratham based on a 1994 OSP population estimate of 5393.

TABLE R-4 -- SELECTED STANDARDS FOR OUTDOOR RECREATION FACILITIES

Facility	Standard per 1000 Population	Standard Applied to Stratham	Current Facilities
baseball diamonds	1.1	6	5
basketball courts	0.8	4	2
boat/fishing access	1.8	10	3
golf courses (18 holes)	0.04	0	0
gymnasiums	0.25	1	1
ice skating area	0.14	1	1
open space/natural areas(ac.)	51	275	?
picnic tables	8	43	?
parks, community (acres)	6	32	108
playgrounds (town & school)	0.5	3	3
playgrounds (acres)	2.1	11	>11
skiing (x-country areas)	0.1	1	?
soccer fields	0.16	1	4
swimming beach	0.5	3	0

Facility	Standard per 1000 Population	Standard Applied to Stratham	Current Facilities
tennis courts	0.95	5	0
trails, hiking (miles)	2.2	11	?

While these standards can be useful in understanding facility needs in an "average" community of a certain size, they are not meant to prescribe specific needs in a specific community. These standards, for example, may point to a facility need where, due to changing local recreation interests, no such need exists, and vice-versa. Nonetheless, a reasoned review of Stratham's existing recreation facilities compared to these standards does tend to support several facility needs that the Recreation Commission has previously recognized.

It appears that for most of the applicable facility types, Stratham meets or exceeds the published standard. The exceptions are: baseball field (currently 1 less than standard); basketball court; boat/fishing access; swimming beach/pool, and tennis courts. The Recreation Department confirms that the existing baseball/softball and basketball facilites to not always meet the demand to use them. Boat and fishing access appear adequate for the boating and fishing opportunities that exist within the Town. Regarding swimming beaches, there is no open water in Stratham with public access that would lend itself to such a facility. On the other hand, public beaches abound in the neighboring Towns of Hampton, No. Hampton and Hampton and residents may also use the outdoor pool in Exeter. Regarding tennis courts, the need or desire for courts has been discussed locally but no conclusion has been reached. Although there appear to be amble courts available in Exeter and surrounding towns, the ebbs and flows in the popularity of tennis may leave Stratham without good access to public courts in the future. Recently there has been increased demand for the Recreation Committee to offer tennis lessons to adults and children interested in learning to play or reviving their skills. With no municipal tennis courts located within Stratham, it has been difficult to respond to this interest.

The volunteer Recreation Committee has seen a significant increase in participation in its programs in the last ten years. While the Town has made some effort to provide additional facilities to accommodate this increase in recreational users, the Recreation Committee has often been challenged by lack of field space and/or volunteers to run existing programs or to expand to programs requested by the Stratham community. As the residential population grows, these challenges will become greater and the need to expand recreational programs, facilities and support can be expected to increase.

5.0 RECOMMENDATIONS

Based on the existing number and types of facilities and the number of volunteers participating in the creation of the recreational programs, as well as expected further growth in the residential population, the following objectives and actions are recommended:

5.1 Parks & Recreation Department and Recreation Commission

- Continue the Town's current approach of meeting recreational activity needs with self-supporting, volunteer-oriented programs.
- Closely monitor the adequacy of existing staffing levels of the Recreation Department to fulfill the

Town's needs and respond when necessary by hiring part-time clerical and/or maintenance staff and by enhancing the volunteer program.

- Work with municipal officials on developing a plan for coordinated maintenance of recreational facilities. Gain political support for the efforts of the volunteer Recreation Committee.

- Consider re-establishing recreational opportunities with the Portsmouth YMCA, the Phillips Exeter Academy facilities, Great Bay Tennis facility and other applicable facilities.

5.2 Facility Maintenance

- Conduct a yearly assessment of the condition of each facility and include major improvements and upgrades in the Town's capital improvements program.

- Increase funding for maintenance of recreational facilities- particularly those facilities that are heavily used.

- Coordinate maintenance of existing facilities with various user groups.

5.3 New Facilities and Programs

- Periodically review the need to expand or alter existing programs based on demonstrated interest and the ability to gain support for the programs through user fee or other means.

- Conduct a facilities needs analysis to identify needs based on existing and anticipated recreational program of the Town. The needs analysis should specifically address the needs for a new softball field, tennis and basketball courts and swimming facility, among others.

- Develop a component of the Town's capital improvements program for developing new or expanded recreational facilities idnetified in the needs analysis.

- Work with the Stratham Board of Selectmen and other municipal officials to seek out funds, including grants, to acquire necessary facilities, or additional program support to carry out the objectives of the Stratham Recreation Committee ten year capital improvements plan.

- Develop new facilities and improve existing facilities in accordance with ADA standards.

- If the Town is unsuccessful in selling the old town hall building, consider using it for an indoor recreational facility and Recreation Committee headquarters. Repair the gym floor as needed.

5.4 Outdoor Recreation/Conservation

- Coordinate Recreation Department future needs with Conservation Commission plans wherever common objectives can be met. Develop a ten-year funding plan for improvements and acquisition of recreational open space in coordination with the Conservation Commission.

- Develop a master plan for the use of the Gifford Farm property which balances active and passive recreation as well as the conservation needs of the site. The property master plan could be a joint effort by the Recreation and Conservation Commissions.

- Coordinate scheduled recreational activities with the Conservation Commission and other environmental groups, such as the Sandy Point Education Center to offer recreational opportunities with an environmental/natural resources focus.

- Seek to establish a public hiking trail by interconnecting, through easements and other agreements with landowners, a network of trails linking public conservation and recreation lands.; the Planning Board should seek to establish trail corridors when reviewing cluster development proposals.

- Work with Conservation Commissions and Recreation Commissions from adjacent communities to develop an interconnected open space and trail network, and to pursue other recreational plans and programs on a regional basis as warranted.

- Conduct an inventory of possible recreation land sites that may become available for donation/acquisition and target those that are most desirable for public acquisition.

- Encourage developers of large subdivisions to donate a portion of their parcels for use by the residents of the Town.

- Increase funding for open space acquisition, enhancement and protection;

STRATHAM MASTER PLAN

3. TRANSPORTATION CHAPTER

STRATHAM MASTER PLAN
TRANSPORTATION CHAPTER

DRAFT

Revision Date: 9-24-96

1.0 INTRODUCTION

One of the main factors in Stratham's future growth will be the ability of the Town's road network to handle an increase in traffic. Stratham, like many other small seacoast New Hampshire towns, developed along waterways and trails connecting it to larger nearby communities, in this case, Portsmouth and Exeter. Stratham has developed with primary reliance on the automobile and the highway network. Other forms of transportation, though represented, are not of primary importance. As the community has grown residentially and commercially the roadway network has expanded to serve newly developed areas and land uses. In recent years Stratham has become much more of a destination point to an increasing number of nearby residents. The steady increase in traffic volumes that has accompanied this growth has resulted in a rise in congestion, traffic accidents and general traffic circulation problems, particularly on and adjacent to Portsmouth Avenue. The planned reconstruction of State Route 51/101 will have a major and prolonged impact on the Town as the project moves into final construction phases over the next four years. The convergence of other major routes (State Routes 33 and 108) in Stratham continues to generate traffic volumes and congestion that push local roads to their capacity. Maintenance and expansion of the roads, improvements in circulation, and wise planning of the location and extent of further development will all play an important role in the Town's future.

Many of the Transportation challenges facing the Town are associated with Portsmouth Avenue and the continued impact of growth along this major highway. The recently concluded Stratham Community Stewardship process highlighted a large number of important issues related to transportation. These issues, along with others identified by the Master Plan Committee include the following:

- poor road systems circulation, especially in the residential areas west of Portsmouth Avenue;
- poor east-west road intersection alignment in several locations along Portsmouth Avenue;
- lack of signalization at several major intersections along Portsmouth Avenue;
- inadequate capacity of secondary roadways east of Portsmouth Avenue and safety concerns about bicycle and pedestrian use of these roads;
- the need to contain the linear extent of further commercial development on Portsmouth Avenue;
- the future configuration of the Stratham Circle and its impact on the "Town Center;"
- the development of secondary service roads to connect commercial developments on Portsmouth Avenue and consolidate existing curb cuts.

This chapter provides an overview of Stratham's transportation system, reviews the recommendations contained in the NH 101 Feasibility Study and attempts to address the issues listed above.

2.0 EXISTING TRANSPORTATION SYSTEM

A. Highway Network and Classification

1. Highway Classification

Stratham relies primarily on its highways to provide the transportation network for private cars, trucks and buses. Stratham is served exclusively by State-classified Class I, II and V highways. Class I roads are State maintained primary or trunk line highways. As shown in **Table 1 -- Road Mileage in Stratham** -- there are presently 9.96 miles of Class I highways in Stratham which include NH 101/ 51 and Portsmouth Avenue (NH 33 and part of NH 108). Class II roads are State maintained secondary highways. There are 7.72 miles of Class II roads in Stratham, including NH 108, (North of the Circle), Bunker Hill Avenue, Winnicut Rd., and Squamscott Rd. Heights Road was formerly a State maintained road, but was turned over to the Town by agreement at the time the signalized intersection was installed at the intersection with Portsmouth Avenue All other roads in Town, except for privately owned and maintained roads, are Class V "Rural Highways" which are the responsibility of the Town to maintain. Class V roads number 31.8 in mileage according to the NHDOT and are the only road type that has grown appreciably in the past several decades. New residential subdivision streets that are turned over to the Town become Class V roads once they become public. It should be noted that Town records indicate that there are more than 45 miles of Class V road in Stratham. The origin of this discrepancy has not been researched.

Table T-1
Road Millage in Stratham by State Classification

STATE CLASS	1970	1975	1980	1984	1995
Class I	9.59	9.59	9.59	9.59	9.96
Class II	7.78	7.80	7.80	7.80	7.72
Class V	13.71	13.71	18.02	20.41	31.86
TOTAL	31.08	31.10	35.41	37.80	49.54

NOTE: There are no Class III (recreational roads), Class IV (urban compact) or Class VI (discontinued public ways) listed for Stratham
Source: NH Department of Transportation

In 1970 and 1975, before the years of rapid residential growth in Stratham, the Town had about 14 miles of Class V road; by 1980 it had grown by about 50% to 18 miles. By 1995, the most recent count available, the mileage had increased to nearly 32 miles, representing another 56% increase. Since 1975, the Town has, on average, increased its town-maintained road mileage by about 4% per year.

In 1993 the NHDOT, in cooperation with the Federal Highway Administration and regional planning commissions, established a revised functional classification of all highways in New Hampshire. These classifications, which compliment the State classifications, are primarily based on the traffic capacity and volumes attributed to the roads. They are important because they are used to determine where and under what conditions Federal highway funds may be utilized. There are four classes, each represented in Stratham:

Principal Arterial: Serves major centers of activity, the highest traffic volume corridors, and the longest routes. In addition, they generally carry the major portion of traffic entering and exiting the community.

Minor Arterial: Links and supports the principal arterial system. Minor arterials are roads which place a greater emphasis on land access than the principal arterial and therefore offer a lower level of mobility.

Collector: Provides both access to land uses along the roadway and circulation within residential neighborhoods, and commercial and industrial areas. It differs from the arterial system in that the facilities on the collector system may penetrate residential neighborhoods. Conversely, the collectors also collect traffic from the local streets in residential neighborhoods and channel it into the arterial system.

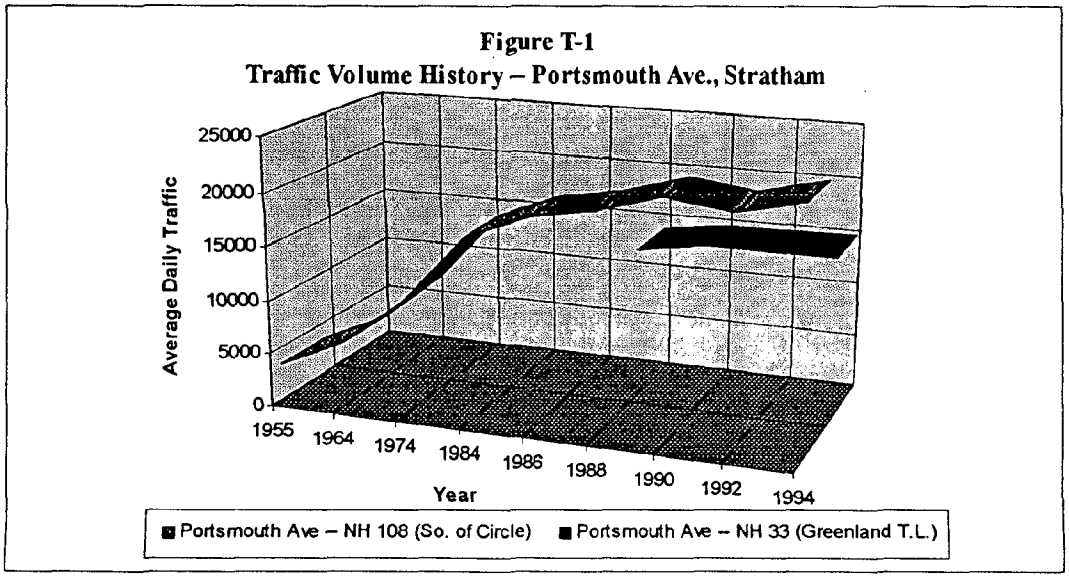
Local Roads: Comprise all facilities not on one of three systems described above. Their function is to primarily provide direct access to abutting land and access to the higher order systems. They offer the lowest level of mobility, and service to through traffic movement is usually deliberately discouraged.

Under this system, NH Route 101/51 is classified as a principal arterial, and State Routes 108 and 33 are classified as minor arterials. Bunker Hill Avenue, Winnicut Road, Stratham Heights Road and others are collectors. The balance of Stratham's roads are classified as local roads which feed traffic into either collectors or arterial roads. **Map T-1 -- Highway Map --** shows the functional classifications for roads in Stratham.

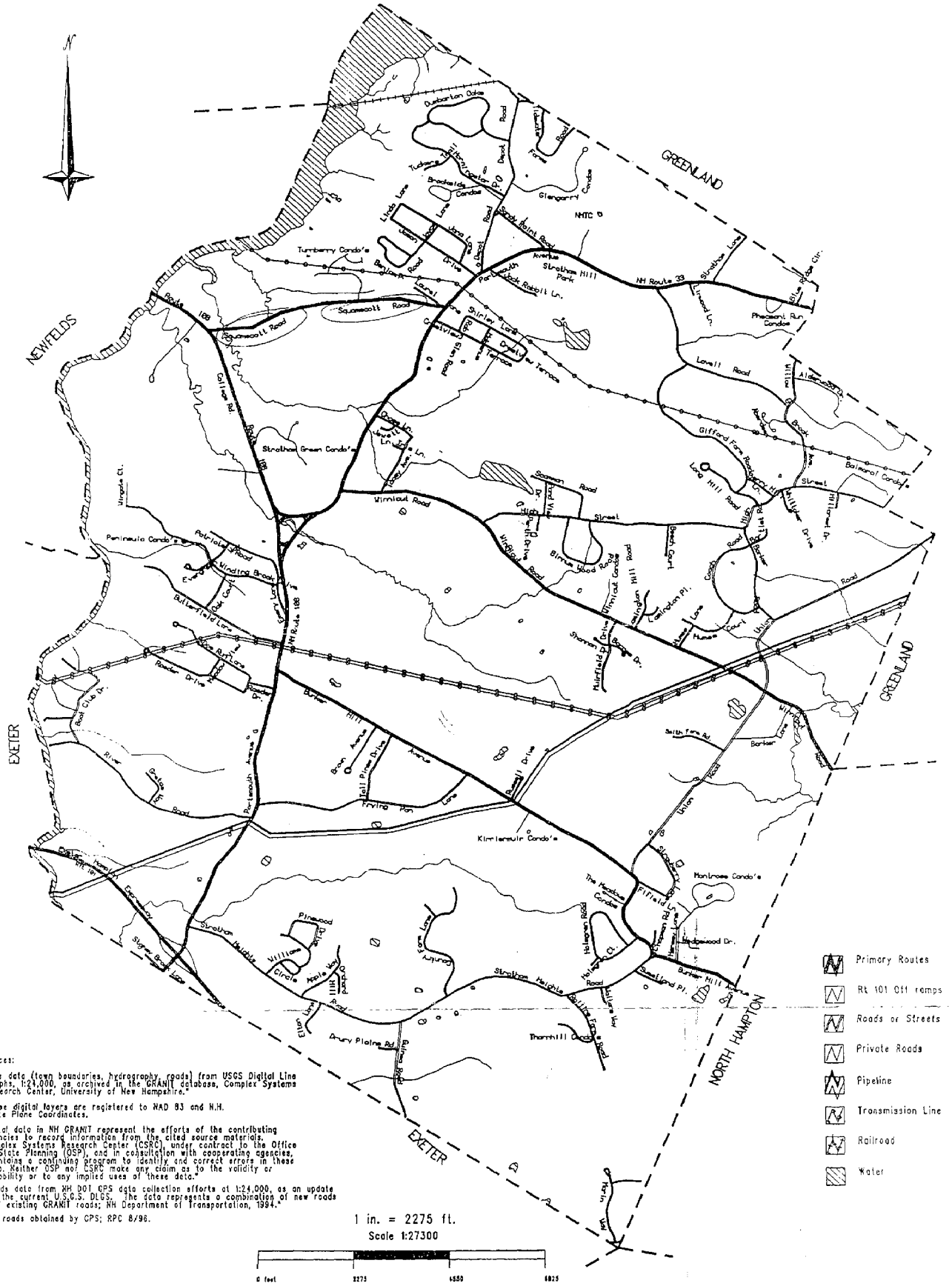
2. Traffic Volumes and Growth

Stratham has exhibited significant increases in traffic volumes over the past several decades. In an effort to monitor changes in traffic volumes the NHDOT and RPC conduct annual traffic counts using automatic recorders at varying locations throughout the region. In addition, the NHDOT maintains a network of permanent counters at key locations around the State to monitor long term trends. One such device is located in Stratham on Portsmouth Avenue just south of the Stratham Circle for which volume records are available dating back forty years. These records, as depicted in **Figure T-1**, show steady growth of Average Daily Traffic (ADT, bi-directional) volume from 3,457 in 1995 to 11,074 in 1975, to nearly 23,000 in 1994.

Figure T-1
Traffic Volume History – Portsmouth Ave., Stratham



Town of Stratham, N.H.
Highway Map



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data."

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

New roads obtained by GPS; RPC 8/98.

1 in. = 2275 ft.

Scale 1:27300

0 feet 2275 4550 6825

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA47020237.

Prepared by the Rockingham Planning Commission
September 18, 1998 DRA

Recent traffic volume statistics for other locations in Stratham are shown in **Table T-2**. Not surprisingly, the road segments with the highest volume are on Portsmouth Avenue in the vicinity of Shaws and Ames Shopping Centers, showing 32,641 ADT in 1995. At the other end of Portsmouth Avenue near the Greenland town line, volumes are less than half that amount -- about 15,000 ADT. This is readily explained first by the branching of NH 108 and its associated traffic (11,000 ADT) at the Stratham Circle and second by the additional localized traffic at the Southern end of Portsmouth Avenue which is transiting to and from Exeter and/or NH 101. The Greenland end of Portsmouth Avenue has experienced traffic growth at about the same rate as the southerly sections. Traffic volume at the Greenland town line grew from 9,000 ADT in 1980 to 15,000 today -- an annual average growth rate of 3.5%. At the permanent recorder station south of the Circle, traffic volume grew at an average rate of 4.1% per year over the same period.

Table T-2
Recent Traffic Counts in Stratham

Road	Location	ADT	Year	Type	Source
NH 108	Newfields T.L.	13,000	1994	AADT	NHDOT
NH 108	north/east of Circle	11,000	1994	AADT	NHDOT
NH 108	near NH 101	32,641	1994	AADT	NHDOT
NH 33	Greenland T.L.	15,000	1994	AADT	NHDOT
NH 108	south/west of Bunker Hill Avenue	22,795	1994	AADT	NHDOT (perm sta.)
Winnicut Rd.	near NH 33	3,016	1995	ADT	RPC
High St.	north of Union	801	1996	ADT	RPC
Union Rd.	east of Bunker Hill Avenue	897	1996	ADT	RPC
Lovell Rd.	Near NH 33	988	1994	ADT	RPC
Bunker Hill Avenue	Near NH 33	2461	1994	ADT	RPC
Frying Pan Lane	Near NH 33	989	1994	ADT	RPC
Stratham Heights	at Ginuea Road	1,536	1996	ADT	RPC
Ginuea Rd.	Exeter T.L.	1,990	1996	ADT	RPC

AADT=average annual daily traffic which has been factored fro seasonal variation
ADT = average daily traffic, uncorrected for seasonal variation.

With the growth in congestion on Portsmouth Avenue has come an increase in the use of secondary roads to bypass Portsmouth Avenue. These secondary roads include Stratham Heights Road, Bunker Hill Avenue, Union

Road, Winnicut Road and others. Although long term historical data is not available, recent trends can be inferred from the changes in volume measured from 1990 to the present, as shown in **Table 3.**

Table T-3
Secondary Road Traffic Counts

Road	1990 ADT	1995 ADT	1996 ADT	Avg. Annual Growth
Stratham Heights Road	1900	na	1536	-3.5%
Bunker Hill Avenue	1600	2461	na	9.0%
Winnicut Rd.	2600	3016	na	3.0%
Union Rd.	1400	na	1023	-5.1%

The counts taken at Stratham Heights road in 1990 and 1996 are not comparable because the 1990 count was positioned west of Ginuea Road (and captured traffic traveling between Portsmouth Avenue and Ginuea Road), while the 1996 count was positioned east of Guinea Rd and therefore missed this popular bypass. The decline in ADT on Union Road is not readily explained except by assuming that one of the counts is faulty. Bunker Hill Avenue and Winnicut Road counts show what most Town residents can attest to: the amount of traffic on these back roads is growing at least as fast as on Portsmouth Avenue itself. Unfortunately, these roads were not designed to safely accommodate high volumes of traffic. Poor sight distances and sub-standard road and intersection alignments are common. The frequent use of these roads by pedestrians and bicyclists raises safety concerns

3. Circulation

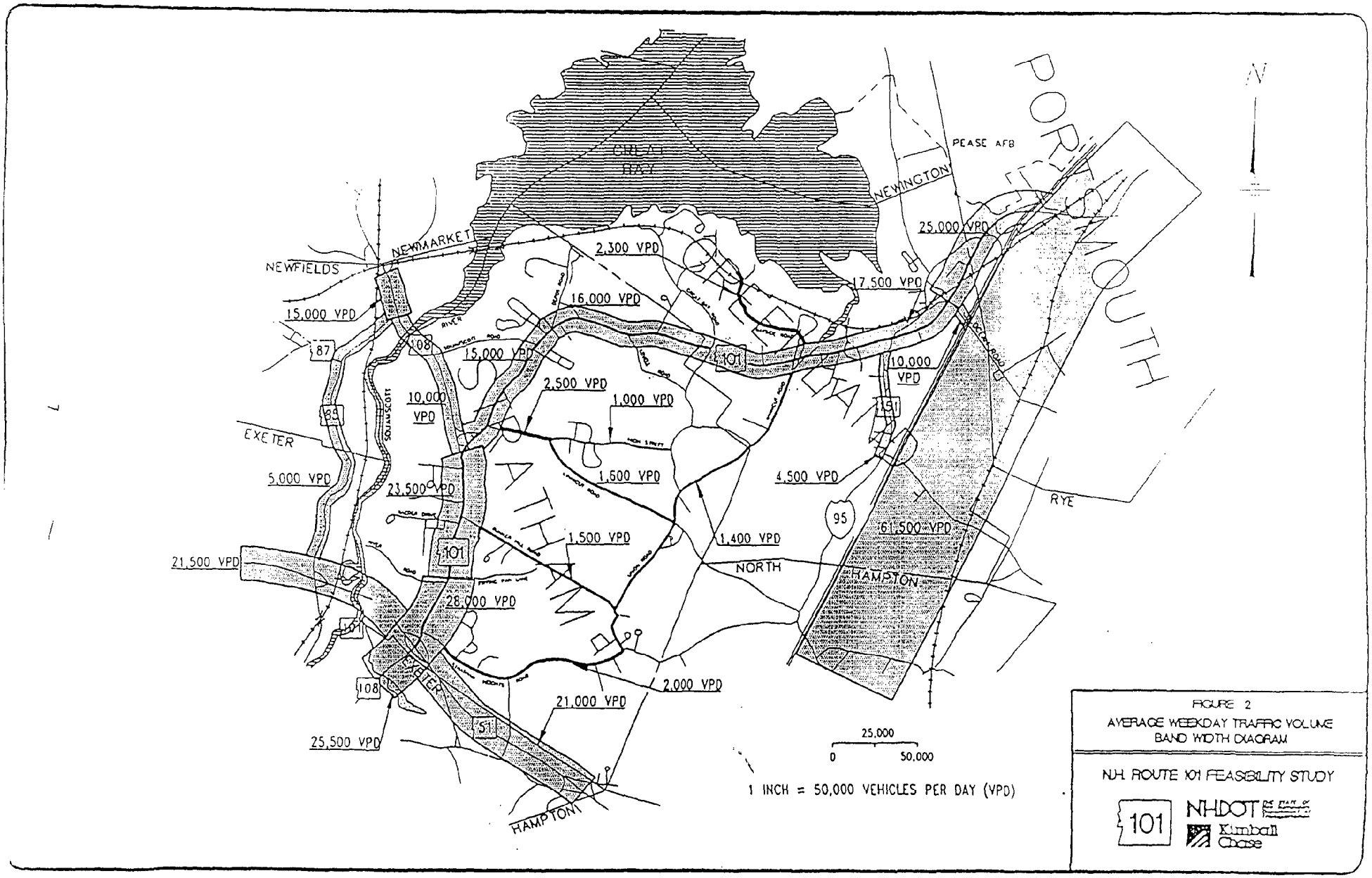
Figure 2 – Average Weekday Traffic Bandwidth Diagram provides a graphical view of the relative size of traffic flows on Stratham's major roads and in neighboring communities. This map was included in the ***NH Route 101 Feasibility Study*** (1992) conducted by the NHDOT. Although the traffic volumes have grown somewhat since then, the relative volumes for the roads shown remain valid.

Portsmouth Avenue acts as the central spine for travel in Stratham, connecting the Town with NH 101 and Exeter to the south and Greenland and Portsmouth to the north. Portsmouth Avenue and NH 108 likewise connect Stratham to Newfields, Newmarket and Durham.

As previously discussed, a secondary circulation pattern has developed as an alternative to Portsmouth Avenue. Motorist use a combination of Stratham Heights Road connecting to Union and Winnicut Road as a bypass around the most congested portions of NH 101. Although the 1992 NH 101 Feasibility Study proved that travel times on this "bypass" are longer than staying on 101, many people prefer the relative free flow of travel even if there is a time penalty.

Other alternative circulation patterns in evidence are NH 108 to NH 33 north via Squamscott Road; High Street short cut onto Winnicut Road and Stratham Heights Road to the Guinea Road "short cut" between the south side of Exeter to Portsmouth Avenue.

FIGURE 2
WEEKDAY AVERAGE TRAFFIC VOLUME



The Town's road network on the east side of Portsmouth Avenue provides relatively good circulation to the existing residential development. The same is not true of the residential roads on the west side, both north and south of the Stratham Circle. At present none of these roads (River Road, Raeder Drive, Doe Run Lane, Butterfield, Winding Brook) connect with one another on their interior ends. This means that virtually all trips originating from these residential areas must access Portsmouth Avenue, regardless of destinations. Likewise, circulation from the western to eastern sections of Stratham is made more difficult by the poor alignment of intersecting roads between east and west. Examples of this are River Road/ Frying Pan Lane, Doe Run Lane/ Bunker Hill Avenue; Squamscott Road/ Crestview Terrace. As a result of these non-alignments, additional traffic and difficult turning movement are added unnecessarily to Portsmouth Avenue.

4. Levels of Service

The 1992 NHDOT 101 Feasibility Study included a comprehensive level of service analysis for the major intersections along Portsmouth Avenue. The results of this analysis are shown on **Table T-4** below.

Table T-4
INTERSECTION CAPACITY ANALYSIS
SUMMARY OF EXISTING CONDITIONS

Stratham	AM Peak Hour (LOS)	PM Peak Hour (LOS)
NH 101/ 108/ 51 EB Ramps		
- existing signalized intersection	B	B
NH 101/ 108/ 51 WB Ramps		
- existing unsignalized intersection	F	F
- potential signalized intersection	B	B
NH 101/ 108/ Heights Road		
- existing signalized intersection		D
- w/ potential left turn lane on NH 101/108		A
NH 101/ 108/ Shaws Plaza		
- existing signalized intersection		C
NH 101/ 108/ Market Basket/ Kings Plaza		
- existing signalized intersection		D
- w/ potential 2nd through lane on NH 101/108 WB approach		B

Stratham	AM Peak Hour (LOS)	PM Peak Hour (LOS)
NH 101/ 108 Bunker Hill Road		
- existing unsignalized intersection	F	F
NH 101/ 108 Winnicut Road		
- existing unsignalized intersection		F
- potential signalized intersection		B
NH 101/ Squamscott Road		
- existing unsignalized	F	F
- potential signalized intersection	B	B

Of the four intersections showing a level of service of "E" or "F," the NH 33/ Squamscott Road intersection has since been signalized due to its history of serious accidents. The NH 101/ 108/ 51 West Bound ramp will be fully reconstructed and signalized as part of the NH 101 Expansion Project. The remaining two -- Bunker Hill Avenue and Winnicut Road -- are not presently scheduled for signalization. At the time of the NH 101 Feasibility Study, the Bunker Hill Road intersection did not meet the minimum signalization warrant standard (because of too low minor street volume). However, the warrant was reanalyzed by the RPC in 1995 and found to meet signal warrants.

5. Travel Patterns

Origin-Destination Study

The Route 101 Feasibility Study included a full roadside origin-destination travel survey. Approximately 25% of all vehicles passing the survey station (south of Bunker Hill Avenue on Portsmouth Avenue) during a full day (6am-6pm) were stopped and interviewed to determine their trip purpose, origin and destination. A vast amount of information was collected about the travel patterns of Portsmouth Avenue users. The results which are included in the 101 Study are summarized as follows:

- **Trip Purpose**: 54% of trips were work related; 20%, were for shopping; 8% were for recreation; 5% were for school and medical each, and 9% were for other purposes.

- **Vehicle Type**: 76.9% of vehicles were automobiles; 20.7% were 2-axle trucks of all types; 1.7% were semi-trailers; less than 1% were motorcycles and buses.

- **Origins:** Nearly 40% of trips origins were in Exeter, followed by Stratham at 18%, then Brentwood-Kingston, Manchester and all other NH and Mass. -- all less than 10%.

- **Destinations:** Trip destinations were divided nearly evenly between Stratham and Portsmouth at about

26% each, followed by Newmarket (12%) and Maine (11%). Oddly, very few trips on Portsmouth Avenue (less than 1%) were destined for Exeter -- a result that is likely to be erroneous.

Commuting Patterns

An analysis of commuting patterns was obtained through data received from the 1990 U.S. Census on place of residence by place of work. Although this data is limited in scope, it is useful in identifying broad patterns of commuting to and from Stratham.

Approximately 2,630 Stratham residents commuted to a job in 1990. Approximately 2,467 or 94 % of Stratham residents commuted either alone or car pooled. The majority of commuters stayed within New Hampshire for employment. **Table T-5 -- Journey-to-Work** is a compilation of the Census date for residents commuting from Stratham to work in other locations and for workers from other locations commuting to Stratham. Nearly 75% of Stratham residents work in New Hampshire and 50% work in the nearby seacoast towns of Portsmouth, Exeter, Hampton, Seabrook -- or Stratham itself. About 17% of working residents commute to jobs in Massachusetts; 3.3% commute to Boston.

6. Public Safety and Highway Accidents

There are several locations in Town with a high incidence of traffic accidents. Many of these locations are characterized by high traffic volumes and/or multiple curb cuts. The top three locations for traffic accidents in Stratham are the 101/Portsmouth Avenue interchange, the Stratham Circle, Portsmouth Avenue between Shaws and King's Plaza, and the Portsmouth Avenue intersections with Bunker Hill Avenue and Winnicut Road. The Squamscott Road/NH 33 intersection, the site of many serious traffic accidents in the past, has been addressed by the installation of traffic signals and turning lanes. Accidents along Portsmouth Avenue between the shopping plazas are usually minor to moderate in nature due to the relatively low travel speeds. Serious accidents are more likely at Bunker Hill and Winnicut Road due to the higher average speeds of traffic in those locations.

A record of motor vehicle accidents for the past five (5) years is shown in Table T-5 below.

TABLE T-6
MOTOR VEHICLE ACCIDENTS
1990-1994

TYPE	1990	1991	1992	1993	1994
Fatal Accidents					
Personal Injury		(CURRENTLY BEING RESEARCHED)			
Property Damage					
Pedestrian Involved					
TOTAL					

There is growing concern about pedestrian and bicycle safety due to the lack adequate shoulders on many of the highly traveled secondary roadways. As bicycle and pedestrian usage on these roads increases (especially on roads used by school children traveling to Memorial School) the potential for serious accidents will grow.

Table T-5

Residents Commuting FROM Stratham To:

New Hampshire	Total Workers	1,958
WORKPLACE	**WORKERS**	**% OF TOTAL**
Portsmouth	451	17.1%
Stratham	376	14.3%
Exeter	302	11.5%
Hampton	114	4.3%
Seabrook	90	3.4%
Newington	74	2.8%
Rye	55	2.1%
Newfields	46	1.7%
Manchester	42	1.6%
Dover	42	1.6%
New Castle	36	1.4%
Somersworth	35	1.3%
North Hampton	33	1.3%
Rochester	31	1.2%
Greenland	26	1.0%
Other Towns	205	7.8%
Total New Hampshire	1,958	74.4%
Massachusetts	**Total Workers**	**456**
WORKPLACE	**WORKERS**	**% OF TOTAL**
Boston	88	3.3%
Newburyport	79	3.0%
Andover	62	2.4%
Danvers	33	1.3%
Wilmington	33	1.3%
Amesbury	31	1.2%
Other Towns	130	4.9%
Total Massachusetts	456	17.3%
Maine	**Total Workers**	**83**
WORKPLACE	**WORKERS**	**% OF TOTAL**
Kittery	68	2.6%
Portland	10	0.4%
Kennebunk	5	0.2%
Total Maine	83	3.2%
Other Locations	**Total Workers**	**133**
WORKPLACE	**WORKERS**	**% OF TOTAL**
Other Locations	133	5.1%
All Workers from Stratham	2,630	100%

Workers Commuting TO Stratham:

New Hampshire	Total Workers	1,901
WORKPLACE	**WORKERS**	**% OF TOTAL**
Stratham	376	18.4%
Exeter	273	13.3%
Newmarket	200	9.8%
Portsmouth	102	5.0%
Dover	88	4.3%
Rochester	71	3.5%
Epping	51	2.5%
Hampton	51	2.5%
Durham	47	2.3%
Brentwood	46	2.2%
Kingston	46	2.2%
Raymond	45	2.2%
Manchester	36	1.8%
Somersworth	36	1.8%
Nottingham	35	1.7%
Kensington	31	1.5%
North Hampton	30	1.5%
Newfields	28	1.4%
Barrington	28	1.4%
Greenland	22	1.1%
Derry	21	1.0%
East Kingston	21	1.0%
Lee	21	1.0%
Strafford	21	1.0%
Fremont	20	1.0%
Other Town	155	7.6%
Total New Hamsphire	1,901	92.8%
Massachusetts	**Total Workers**	**45**
WORKPLACE	**WORKERS**	**% OF TOTAL**
Salisbury	10	0.5%
Haverhill	9	0.4%
Plymouth	8	0.4%
Georgetown	7	0.3%
North Andover	7	0.3%
Amesbury	4	0.2%
Total Mass.	45	2.2%
Maine	**Total Workers**	**103**
WORKPLACE	**WORKERS**	**% OF TOTAL**
Kittery	45	2.2%
Kennebunk	16	0.8%
South Berwick	13	0.6%
Eliot	12	0.6%
York	9	0.4%
Lebanon	6	0.3%
Arundel	2	0.1%
Total Maine	103	5.0%
Total Workers	**2,049**	100.0%

Emergency Vehicle Access

Two characteristics of the Town's transportation system have the potential to negatively impact public safety and, in particular, emergency vehicle access. First is the high degree of peak hour traffic congestion on Route 108/33 near the Stratham Town line. At these peak periods it becomes very difficult for Fire and Police vehicles to pass through this area to respond to emergencies. Absent an alternative road in close proximity to this route to the west end of Town, this may present an impediment to public safety. Secondly, the preponderance of dead end streets which do not connect with one another, particularly on the west side of Portsmouth Avenue, could prevent emergency vehicle access should the single dead-end roadway become temporarily blocked. Since construction of many of these roads, the Town has enacted regulations to limit the length of dead-end roads to 800 feet unless near future connections are possible.

7. Other Highway Issues

Truck Traffic

As the area grows, additional truck traffic can be expected. In order to ensure that trucks use the proper roads, the town should enforce RSA 47:17, Section VIII "Traffic Devices and Signals" which empowers the Board of Selectmen:

> "To make special regulations as to the use of vehicles upon particular highways, except as to speed, and to exclude such vehicles altogether from certain ways; to establish stop intersections, erect and provide for the control of traffic by, stop signs or other traffic devices or signals which shall conform to standards set by the highway commissioner and shall be approved by him as to type, size, installation and method of operation."

This RSA allows Stratham to adopt an ordinance restricting vehicles above certain weights (to be determined by the road agent) from designated Town roads during seasonally wet periods.

Dead-End Roads

There are a large number of dead-end roads in Stratham . The town limits the length of dead-end roads to 800 feet unless near future connections are possible. Not only do long dead-end roads represent an inefficient road design and require police, school and postal service vehicles to retrace their routes, but they can also present a safety concern. Too many houses served by only one access point increases the risk of emergency vehicles not being able to respond because the one road entrance is blocked for some reason. For these reasons, the Planning Board should maintain and enforce the limit on the length of dead-end streets.

Route 101/51 Reconstruction and the Connector Road

The NHDOT's plan to reconstruct 17 miles of highway from Epping to Hampton will have a tremendous effect on the Town of Stratham. The plan will expand the existing two lane roadway into a four lane, limited access, divided highway. Most of the new highway will closely parallel the existing road, keeping impacts to a

minimum. The Route 101/51 project began in 1992 with the reconstruction of the Route 85/101 interchange and the bridge replacement over the Squamscott River. The reconstruction of the Route 101/51 interchange and the associated widening of Portsmouth Avenue are expected to be completed in 1999. The State's target is to complete the entire 17 miles of reconstructed highway by the year 2000.

The reconstruction of Route 101/51 will have a major impact on traffic, both during and after the completion of the project. The location and design of interchanges at Portsmouth Avenue, Spur Road and Route 111 (North Hampton Road) will have a major influence on the flow of traffic in and out of Town.

Scenic Roads

Roads may be designated within a town as scenic roads, as specified by RSA 231:157. In order to designate any road in a town as scenic, other than a Class I or Class II highway, 10 persons owning land abutting the proposed road can petition the town to do so. In turn, the Town votes on it at any regular or special town meeting. Voters can also rescind the designation of a scenic road at a regular meeting upon petition.

There are two potential benefits for the town in designating scenic roads. First, it establishes a procedure for protecting the rural landscape within a public right-of-way. Secondly, it can demonstrate the public's interest to preserve the rural qualities of a road. Both can help preserve the scenic quality of the road in the event that changes to the road are proposed (i.e. widening, removal of walls and trees, etc.).

The effects of designating a road scenic are detailed in RSA 231:158. Included are restrictions upon the repair, maintenance, reconstruction or paving work which is done to the road. Two important facets of the designation are that it does not affect the eligibility of the Town to receive construction, maintenance, or reconstruction funds, or affect the rights of any land owner with respect to work on his own property. To date, no roads have been designated in Stratham as "scenic".

B. Public Transportation

Limited public transportation service is available in Stratham through COAST (the Cooperative Alliance for Seacoast Transportation). COAST provides both a demand-response service and a newly established fixed route service. The demand-response service is provided through Lamprey Health Care and is available by arrangement for medical and shopping trips for the elderly and disabled. In 1995, COAST inaugurated a new fixed route service, known as Route 7, which connects Exeter to Portsmouth and Newington via Stratham and Greenland. Route 7 runs 5 days per weeks making four round trips per day. The bus stops in two locations in Stratham, Kings Plaza (Wickett's Restaurant) and the NH Technical College. The Technical College played a key role in initiating and funding the Route to provide alternative means of transportation to students with no cars.

COAST reports steady growth in ridership on Route 7. However, the continuation of the service will depend on the continuation of Federal Transit Administration funding. The Town should consider modest financial support for the service, to help ensure that the service remains in place. In the future, such service may play a much more important role in reducing traffic congestion on Portsmouth and increase mobility for students and the elderly.

C. Rail

One active rail line exists in Stratham. Known as the Portsmouth branch, the line connects the B&M Main Linc (running through New Hampshire via Exeter and Dover) to Portsmouth via Newfields, Stratham and Greenland. This line is primarily serves the NH Port Authority, the Portsmouth Naval Shipyard and several businesses along the Hampton Branch line. The line is in poor condition and supports maximum speed of only 10 mph. On average approximately three trains per week traverse the line between Portsmouth and Rockingham Junction in Newfields.

Passenger rail service may become accessible to Stratham residents once again should the proposed Amtrak service between Boston and Portland proceed as planned. This service, which is now projected to start in the summer of 1997 would run on the Boston & Maine main line and include station stops in Exeter and Dover. Three to four round trips per day are expected. COAST has indicated its intent to coordinate its bus schedules with those of the train service, in which case, it would be possible for Stratham residents and daily commuters to access the train using public transportation. Although a number of issues are yet to be resolved, it appears relatively certain that rail passenger service will be restored from Portland to Boston and will include a stop in Exeter.

D. Pedestrian Travel

While not normally considered an alternative mode of transportation, pedestrian movement does, in fact, represent another means of travel and as such merits consideration. While the Town has no sidewalk system, about 25 Stratham residents walk to work (according to the 1990 Census) and many children walk to and from school. In terms of location, pedestrian travel occurs most frequently on sidewalks, paved and unpaved shoulders and road rights of way.

In general the Town does not encourage the construction of sidewalks in new residential subdivision construction. This is because the residential development in Stratham lacks sufficient population density to warrant their construction and maintenance expense. The Public Works Department does not have the available manpower to maintain sidewalks. However the Town should reconsider this policy in circumstances where there is a significant amount of pedestrian and bicycle travel. Tow example are along the roads close to Memorial School, and within and connecting the Shopping Centers along Portsmouth Avenue.

E. Bike Travel

Bicycle transportation represents a seasonally dependent alternative to motorized transportation in Stratham . According to the 1990 Census, few Stratham residents -- less than 1%-- utilize bicycles to travel to and from work. However, there is a fairly significant number of youth (primarily elementary students) who travel to and from school by bicycle. In contrast to the relatively low number of bicycling commuters, a large and growing number of individuals use bicycles for recreational purposes. Many of the roads in Stratham most used by bicyclists have inadequate shoulders to safely accommodate them. This is generally true of all of main secondary roads in town, as previously identified.

F. Park and Ride Lots/Ridesharing

The NHDOT has constructed 21 park and ride lots at 21 sites around the State in support of individual efforts to carpool. There are no such lots in Stratham however, the NHDOT maintains a park and ride lot in Hampton. The lot is located located on Route 27 near the I-95 toll plaza and is well situated to serve Stratham residents who commute via I-95. This lot was recently upgraded and expanded to include pavement and striping, lighting and a public telephone. This lot is served by daily commuter buses to Boston operated by the Coach Company. The lot has the capacity for approximately 65 cars and averages half to two-thirds utilization on a typical weekday. Organized Ridesharing is an important opportunity for residents who commute long distance to their jobs. The NHDOT, in cooperation with the Seacoast MPO and COAST is expected to initiate ridematching services in the Fall of 1996 to help commuters find potential ridematches. In addition the Massachusetts organization Carivans-for-Commuters assists groups of commuter to organize vanpools for ridesharing. The Town should assist in promoting such services as a way to reduce overall peak hour traffic congestion on the region's roadways.

3. FUTURE ROAD LAYOUTS

A. Potential Improvements to the Road Network

The Master Plan Committee has identified internal road circulation problems in several locations in Town, as well as potential solutions to some of those problems. These problems largely result from three different but related conditions: first, misaligned intersections with Portsmouth Avenue, second, multiple curb cuts in the congested sections of Portsmouth Avenue, and third, dead end residential streets on the west side of Portsmouth Avenue.

The mis-alignment of several roads intersecting Portsmouth Avenue causes unnecessary turning movements onto the highway. With minor relocations they could form aligned four-way intersections and greatly ease east-west travel in Town. There are three such instances that could be corrected with minor relocations:

-- River Road-/-Frying Pan Lane;

-- Raeder Drive-/-Bunker Hill Avenue;

-- Squamscott Road -/- Crestview Terrace/Shirley Lane

Multiple curb cuts on Portsmouth Avenue, especially those across from Shaws Shopping Center worsen the congestion on this part of the highway. These could be consolidated to a single perpendicular drive which meets the Shaws entrance in a four way intersection. This type of alignment is shown in the NH 101 Feasibility Study. Properties which lose direct access to the highway would gain access through an interior service driveway parallel to Portsmouth Avenue Future curb consolidations on the east side might be made possible with the layout of a new commercial access road behind existing development connecting Stratham Heights Road with Frying Pan Lane. Such a road would have the added benefit of opening access to additional commercially zoned land without further extending commercial zoning on Portsmouth Avenue. The same opportunity may exist on the west side of Portsmouth Avenue with the layout of an access road from River Road south to intersect with the proposed extension from the Shaws entrance.

The problems associated with dead end streets have already been discussed. The Master Plan committee has identified three connections that would help improve internal circulation:

-- connect Raeder Drive and River Road;

-- connect Doe Run Lane and Butterfield Road at the intersection with Oak Court, and possibly relocate the entrance of Butterfield to join Raeder Drive at the proposed four way intersection with Bunker Hill Avenue

-- connect Tanzy Road to Crestview Terrace;

A fourth connection was considered (Depot Road and Jano Lane, with the closure of the Ports. Avenue entrance of Jason Drive) but has doubtful feasibility due to existing development in the area. All of the proposed connections and consolidations will need detailed site evaluations to determine feasibility.

B. Protecting Future Road Corridors

The consideration of desired future road layouts raises the question of protecting these corridors from future development An example of this is found in the recent development of two commercial establishments across from River Road where the Frying Plan Road realignment would likely have been built. Although the Planning Board was aware of the long range plan for relocating Frying Pan Lane, the Town had no ability to prevent the development short of condemning and purchasing a ROW easement.

Under New Hampshire RSA 674:9-13, Towns have the ability to establish an "Official Map" which formally establishes future road layouts as established by the Planning BoaRoad The following steps are required:

1. the Town Meeting must authorize the Planning Board to prepare a "major street plan"

2. the Planning Board would then need to develop the street plan and have the exact location of the recommended street lines surveyed and adopt it as part of the Master Plan

3. the Town Meeting may then adopt an ordinance establishing the major street plan as the Official Map

4. the Map, as certified by the Town Clerk, would then be filed at the Registry of Deeds.

There are several problems with this approach. First it presumes that the Planning Boards will know or can determine the exact locations and alignments of future roads; second, it will be very costly to complete the surveys required, and third, one established, the Town may be exposed to "inverse condemnation" liability and be forced to purchase development rights on land adversely impacted by the road layout. Perhaps for all of these reasons, only two communities in New Hampshire have used the Official Map provisions of the State's planning statutes.

An alternative approach is for the Planning Board to develop a general, "non-official map" showing a conceptual plan of future roads and connections, but not specify the exact locations or routes. The specifics rights-of-way would be developed by negotiating with individual land owners as they seek approvals from the Planning Board for specific development plans.

4. PORTSMOUTH AVENUE CORRIDOR PLAN

The most important transportation planning issue for Stratham can be summed up in two words "Portsmouth Avenue." As has been referenced repeatedly in the chapter, the entire corridor from the Exeter-Stratham town line to Portsmouth was the subject of a highly detailed planning study entitled the ***NH Route 101 Feasibility Study*** which was prepared by Kimball-Chase Engineers in 1992 under the direction of the NHDOT. The study included an in-depth analysis of existing traffic conditions, projected traffic growth along the roadway based on a development buildout analysis, and identified both short term improvements that were needed immediately, and longer range improvement that are expected to be needed by the year 2010. The Study is an invaluable planning document in that it provides the Town with a clear picture of the likely future configuration of Portsmouth Avenue which they can "plan around". It also previews the consequences of unchecked development in the corridor: a five-lane typical road cross-section with center turning lane and occasional raised medians, and many new signalized intersections. This is not a vision that most Stratham residents would like to see for the central corridor in their community.

As with any long range plan, it is likely that the 101 Feasibility Study will prove to be inaccurate in some respects. Nonetheless it will continue to be the basis for identifying specific roadway improvements to be implemented in the corridor. It is incumbent on the Town to periodically review the recommendations made in the Study, revise them as needed and communicate these changes to the NHDOT. Perhaps even more important, the Town should evaluate all future development proposals on Portsmouth Avenue to ensure their consistency with the corridor recommendations of the Study which the Town accepts.

As part of their review of transportation issues the Master Plan Committee has reviewed both the long range and short range highway facility recommendations in the Study to determine their applicability and consistency with the Town's view of the corridor's future. The Matrix found on the following page summarizes the results of that review.

No specific funding is in place to construct the conceptual plans shown in the Study, nor are any included in the current State Ten Year Program (FY 1997-1999, June 1996). Given that some of these improvements are already overdue on the basis of need, it is important that the Town work closely with the Seacoast MPO and NHDOT during the transportation project selection process to secure funding support for agreed-upon projects.

Table T-7
STATUS OF PORTSMOUTH AVENUE FACILITY RECOMMENDATIONS
(Recommendations from: "*NH Route 101 Feasibility Study,*" NHDOT, 1992)

FACILITY LOCATION	CONCEPTUAL DESIGN	CONSISTENT WITH LOCAL PLANS	APPROX. COST	TIME FRAME	COMMENTS
NH 101/ 108 Interchange	Full signalization of all 101 off ramps.	generally consistent	unknown	1999	Design in Feasibility Study has been superseded to combine with 101 expansion project.
Portsmouth Avenue - Shaws to River Road	Additional left turn lanes; Left turn lane to Ames.	generally consistent	unknown	Short term 2000	Needs further study regarding curb consolidation.
River Road/ Frying Pan Lane Realignment	Locate Frying Pan Lane to meet River Road.	partially	unknown	short term	New development on Portsmouth Avenue precludes original plan; Substitute with partial relocation of both River Road and Frying Pan Lane.
Bunker Hill Avenue	Full signalization with left turn lanes.	yes	$250,000	short term	The Town should propose the project through the MP TIP selection process.
Emery Lane	Realign south entrance to 101; Close north entrance.	yes	not applicable	long term	Implementation should coincide with Stratham Circle reconstruction.
Stratham Circle	Major reconstruction (see scheme 1 - Feasibility Plan)	uncertain	not applicable	long term	Design will need full reevaluation prior to preliminary engineering.
Winnicut Road	Full signalization	yes	$300,000	short term	The Town should propose the project through the MP TIP selection process.
Squamscott Road	Full signalization	yes	$285,000	completed	Already constructed.
Squamscott Road/ Shirley Lane Ext.	Close Crestview Terrace; Construct Extension to Shirley Lane to intersect at Squamscott Road; Close existing Laurel Lane access and build new access 1,000 ft. from intersection.	yes	not applicable	long term	Improves safety and east-west circulation.
Portsmouth Avenue - All Segments	5 lane typical section with center turn lane.	South of Circle, yes; North of Circle, no	not applicable	long range	Planning Board believes 3 lanes (center turning) volume in 2010 will be adequate on NH 33 section of Portsmouth Avenue.
Raised Medians at Intersections	Construct raised medians on approaches to most intersections	generally consistent	not applicable	short term & long term	Should be evaluated on ca by case basis.

5. FEDERAL AND STATE TRANSPORTATION PLANNING

A. ISTEA

The enactment of the national Intermodal Surface Transportation and Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA) have begun to significantly change the way transportation planning and project programming is done in New Hampshire. These changes are most significant for communities such as Stratham which are not part of existing "metropolitan areas" but are within the area considered not in attainment for meeting air quality standards. The basic thrust of ISTEA is to increase and elevate the importance of local decision making in the regional, state, and federal transportation planning process.

Since 1982, much of the responsibility for transportation planning in the Seacoast of New Hampshire has been carried out by the Seacoast Metropolitan Planning Organization (MPO). The Seacoast MPO is responsible for developing a transportation plan and a prioritized list of capital improvements for transportation. However, the Seacoast MPO's area of jurisdiction only covers a small portion of the Rockingham County portion of the Seacoast -- namely Portsmouth, Newington, Rye and New Castle. The remaining areas, including Stratham , have not been part of this process. In October of 1993, the Seacoast MPO was formally expanded due to requirements of the Clean Air Act, to include 14 other Seacoast communities, including Stratham and all of its neighboring towns.

The expansion of the MPO will be meaningful to the Town in several ways. First, Stratham will be entitled to have appointed representation on the MPO's technical advisory committee. The "TAC", as it is called, oversees, directs and approves the transportation planning activities, including specific traffic, corridor and transit studies, that can be carried out in the community. This means that the Town can now request transportation planning assistance from the MPO. Thirdly, Stratham must now be included in the MPO's long range transportation plan. Lastly, and probably most importantly, transportation improvements planned for Stratham that involve federal funds, must now be included in MPO transportation improvement programs in order to be funded.

B. MPO Project Selection and Planning Process

ISTEA's transportation planning requirements call for the development of a project specific long range transportation plan, covering a twenty year horizon. The MPO Plan will, in the future, draw heavily on the Transportation components of local master plans and will identify conceptual transportation improvements needed in the region. From this plan, the MPO will develop the Transportation Improvement Program (TIP) on an ongoing two year cycle. The TIP will be developed as a prioritized list of projects for implementation.

Under the federal rules for Metropolitan Planning, adopted in October of 1993, the Seacoast TIP and the NH State TIP (previously known as the 10 year plan) must be completely consistent for at least the first three years of implementation. Given the importance of both the MPO Plan and TIP in defining the future transportation system in the region, it behooves the Town to become and remain actively involved in the MPO -- both at the Technical and Policy Committee levels.

To address the issues addressed above, the following recommendations are made:

1. The Town should appoint an active representative and an alternate to the Seacoast MPO Technical Advisory Committee at its earliest opportunity and maintain a close working relationship with the MPO.

2. The Town should develop and submit to the MPO a specific list of needed transportation improvements eligible for federal funding, for consideration during the next TIP development cycle.

6. RECOMMENDATIONS

The following series of policies and recommendations are based on the information and analysis presented in this chapter, and on two other sources: recommendations generated from Stratham Community Stewardship Project held in the Spring of 1996, and , those policies and recommendations from the 1985 Master Plan that continue to be valid.

It is a fundamental goal of the Town of Stratham to achieve and maintain a safe, efficient transportation system which supports the rural character of the community and is adequate to support the transportation demand of the community. To attain this goal both now and in the future, the following policies are established and recommendations made.

POLICY 1: It is the policy of the Town of Stratham to work in cooperation with the NH Department of Transportation and the Seacoast MPO (RPC) to accomplish the phased implementation of agreed-upon highway facility improvements along Portsmouth Avenue.

Recommendations

1. Use the 1992 *NHDOT Route 101 Feasibility Study* as a guide for identifying, planning, and timing for highway facility improvements and communicate with the NHDOT regarding recommended changes to the corridor plan.

   a. recommend the following changes in the Study recommendations: the addition of a signalized intersection at Bunker Hill Avenue;

   b. request the Seacoast MPO to reevaluate the traffic projections for the year 2010 in the NH 33 section of Portsmouth Ave. to determine if a 3 lane (one turn lane) will be adequate to accommodate forecast traffic volumes.

   c. request that the NHDOT reevaluate, with full community involvement, the proposed conceptual design for the Stratham Circle interchange prior to this design moving forward to implementation.

2. Work toward early implementation of the following high priority projects for Portsmouth Avenue:
   -- signalization at Bunker Hill Avenue;
   -- signalization at Winnicut Road;
   -- relocation/realignment of River Road and Frying Pan Lane, and possible signalization;
   The Town should proposing that they be added to the Seacoast MPO transportation improvement program and to the State 10 Year Program.

3. Work in cooperation with the NHDOT and property owners through the site plan approval process to consolidate existing curb-cuts and channel access points to signalized intersections using interior service roads.

4. The Planning Board should develop a "Portsmouth Avenue Access Management Plan" which identifies potential curb cut consolidation, and establishes a driveway access protocol with the NHDOT to ensure consistency of permitting with the management plan.

5. The Planning Board should consider establishing a highway impact fee district, pursuant to RSA 674:21, consisting of the portion of Portsmouth Ave. between the Stratham Circle and the Exeter Town Line. Additional development occurring within this district would be required to contribute a fair share portion of the cost of making planned highway improvements.

POLICY 2: It is the policy of the Town of Stratham to implement improvements on the Town's secondary road system needed to accommodate increased traffic volumes, as well as bicycle and pedestrian use, and to work with the NHDOT to implement like improvements on State owned secondary roads.

Recommendations

1. The Town should seek assistance of a professional transportation engineering consultant to prepare a needs analysis of the secondary road system in Stratham.

2. The Town should actively monitor changes in traffic volumes and accidents on the secondary road system. and request assistance from the Seacoast MPO to carry out this task.

3. They Town should include the construction of 4 foot paved shoulders for use as bicycle/pedestrian lanes, and appropriate signage and striping on the following secondary roads:
   - -- Bunker Hill Avenue
   - -- Winnicut Road
   - -- Heights Road
   - -- Union Road
   - -- Sandy Point Road
   - -- Depot Road

POLICY 3: It is the policy of the Town of Stratham to create a well connected road system in the community that provides efficient circulation, ensures public safety and channels commercial traffic away from residential neighborhoods.

Recommendations

1. The Planning Board should develop and adopt a conceptual road layout map (the "unofficial map") showing desired connections between existing streets and general location of any new roads and rights of way they may be required. This map should be used as a guide for the evaluation of street layout proposed for new development.

2. In preparation of the road layout map, the Planning Board should evaluate the following connections and proposed streets
   - -- connect Raeder Drive and River Road;
   - -- connect Doe Run Lane and Butterfield Road at the intersection with Oak Court, and possibly relocate the entrance of Butterfield to join Raeder Drive at the proposed four way intersection with Bunker Hill Avenue
   - -- connect Tanzy Road to Crestview Terrace;
   - -- new commercial access road connecting Stratham Heights Road to Frying Pan Lane
   - -- new commercial access road connecting River Road to Shaws entrance extension

3. The Town should consider the purchase the development rights of critical right-of-way that would be necessary

to complete or accomplish the connections listed above.

4. The Planning Board should discourage the creation of dead-end streets, and should require the reservation of one or more right-of-way parcels at appropriate connection points in all street designs for new subdivisions.

POLICY 4: It is the policy of the Town of Stratham to participate in the regional transportation planning process established under Federal and State law.

Recommendations

1. The Town should appoint an active representative and an alternate to the Seacoast MPO Technical Advisory Committee at its earliest opportunity and maintain a close working relationship with the MPO.

2. The Town should develop and submit to the MPO a specific list of needed transportation improvements eligible for federal funding, including highway, pedestrian, bicycle and other facilities, for consideration during the next TIP development cycle.

POLICY 5: It is the policy of the Town of Stratham to encourage, support and participate in COAST, the regional public transportation system

Recommendations

1. The Town should widely publicize the availability of the COAST service (Route 7) to the citizens of Stratham, though mechanisms such as tax bill mailing, the Annual Town report, and other community announcement media.

2. The Town should consider entering into an intermunicipal agreement with the other communities and organizations served by COAST to formalize the rights and obligations of all participants.

3. The Town should consider providing modest funding support to COAST, if required to maintain the existing route service given declining Federal support for the system.

POLICY 6: It is the policy of the Town of Stratham to work with the Boston & Maine Railroad (Springfield Terminal Railroad) to improve recreational boating access to the Great Bay via the Squamscott River.

Recommendations

1. Town officials should meet with company and NHDOT and other appropriate officials to review current condition of the railroad bridge and possible solutions.

2. The Town should consider applying for coastal program, as well as other private and public funding sources to address the solutions.

STRATHAM MASTER PLAN

4. HOUSING CHAPTER

STRATHAM MASTER PLAN

DRAFT

HOUSING CHAPTER
(Revision Date: 8-15-96)

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HOUSING

1.0 Introduction

Stratham remains a predominantly residential community. The Town has experienced rapid growth in residential development since the mid 1960s. This sustained growth has brought challenges to every aspect of the community to keep pace with the growing demand for services, including, roads, schools and community facilities. One of the principal challenges now facing the community is to determine how best to accommodate additional housing growth while maintaining the very character of the Town which attracted so many of its residents in the first place.

Housing is one of the most important and challenging issues to be addressed in the master planning process. Over the past decade, New Hampshire communities, especially those in the southern tier of the State have become increasingly judged by the Courts on their performance in allowing for a wide range of housing needs -- housing which serves the requirements of a wide spectrum of age and income groups, including low and moderate income families. While facing the need to actively accommodate such housing needs communities are also facing fiscal challenges which argue toward promoting higher valued housing development to help offset property tax impacts.

During the period of rapid building expansion, which followed the completion of the 1985 Master Plan, housing costs in southern New Hampshire escalated rapidly and exceeded the ability of many wage earners to keep pace with the increases. Housing affordability became a major issue in Southern New Hampshire as steep housing costs put home ownership out of reach of even moderate income households.

Since the last update of the Stratham Master Plan was completed in 1989, changes in the State Planning Enabling laws which specify master plan content (RSA 674:2) as well as the results of the Rockingham Superior Court cases *(Lewis Builders et.al vs. Atkinson, and Britton et.al. vs. Chester)* require Towns to assess housing needs of all income groups, including housing needs in context with the surrounding region. RSA 674:2 III requires that a master plan contain a housing section which

> "... analyzes existing housing resources and addresses current and future housing needs of residents of all levels of income of the municipality and of the region in which it is located, as identified in the regional housing need assessment performed by the regional planning commission pursuant to RSA 36:47, II."

To adequately address these issues, this chapter of the Master Plan will assess the existing housing stock and housing costs of Stratham in comparison to surrounding communities, review the Town's existing residential zoning requirements, and consider the results of the latest regional housing needs assessment prepared by the Rockingham Planning Commission. The Chapter will conclude with general recommendations regarding policies and actions that may be needed to address present and future housing needs of the town and region.

2.0 Previous Housing Studies

While there have not been any formal housing studies conducted within the past ten years, the 1985 and 1989 Master Plan and Master Plan updates have identified the importance of housing issues. The 1985 Master Plan and 1989 update included statistical reviews of the housing stock, projected future needs, and addressed several issues regarding growth management. More recently, through its Growth Management and Innovative Land Use Control Ordinance, the Town has established a system by which it can review number of new lots created, and the numbers, types and costs of new

housing units. From this information the Planning Board can review current housing issues and problems and can make recommendations.

In past two Master Plans there has been a desire to "maintain a well planned community with a rural residential and agricultural character with affordable housing, diversified but limited commercial and economic development, and protected natural resources." To this end, the Town of Stratham has established the following housing policies:

1. Encourage Affordable Housing: The Town of Stratham should encourage the investigation of the innovative development of decent, safe housing which can be purchased or rented by low, moderate or middle income households.

2. Encourage Increase of Elderly Tax Exemption: The Town of Stratham should consider increasing the availability of tax exemptions for elderly residents.

3. Consider Elderly Housing Overlay: The Town of Stratham should consider the establishment of elderly housing and/or the establishment of an overlay district for elderly housing.

These policies remain valid today, thought they have not yet been implemented.

3.0 Housing Demographics

A wide diversity in housing types is an indication that a community's housing policies are responsive to the needs of various income and age groups. The aforementioned court cases (*Atkinson and Chester*) both involved allegations that local zoning and land use regulations, taken as a whole, caused discrimination against low and moderate income groups by limiting opportunities for affordable housing. A comparative assessment of Stratham's housing stock and costs is important to determine the adequacy of the housing supply for meeting a wide range of need. The following paragraphs review recent demographic information pertaining to growth, type and costs of the housing stock in Stratham as compared with ten surrounding towns as well as the County and the State. In addition, comparisons of median income and income distribution are made to further illustrate community housing characteristics.

Growth in Housing 1980-1990

According to the 1990 federal Census, there were a total of 1,917 housing units of all types in Stratham in 1990. Of these, 1,812 or 94 % were year-round, occupied units. Between 1980 and 1990, 1,073 units were added to the Town's housing supply, representing a 122% increase (see **Tables H-1** and **H-2**). This compares to a population increase of 71% (from 2,507 in 1980 to 4,955 in 1990) during the same period.

This disparity is explained by the continuing decline in the average number of persons per unit, which declined from 3.1 to 2.7 in the period. Similar declines in household size were seen in all of the surrounding communities as well. Stratham's housing supply grew at faster rate than most of the surrounding communities, in part due to its large size, amount and availability of undeveloped land, and due to a more permissive zoning ordinance regarding residential development compared to surrounding communities.

Table H-1
Occupied Housing Units and Persons per Unit
1980 & 1990 US Census

TOWN/AREA	Housing Units (occupied, yr round units) 1970	1980	1990	Avg. Annl. Growth Rate 70-'80	'80-'90	Average Persons per Unit 1980	1990
STRATHAM	*457*	*805*	*1,812*	*5.8%*	*8.5%*	*3.1*	*2.7*
Brentwood	381	543	755	3.6%	3.4%	3.7	3.4
Exeter	3,081	4,182	4,975	3.1%	1.8%	2.6	2.5
Greenland	528	703	1,008	2.9%	3.7%	3.0	2.8
Hampton	2,716	4,086	5,046	4.2%	2.1%	2.6	2.4
Hampton Falls	382	462	533	1.9%	1.4%	3.0	2.8
Kensington	334	434	559	2.7%	2.6%	3.0	2.9
Newfields	231	274	312	1.7%	1.3%	3.0	2.8
Newington	293	252	298	-1.5%	1.7%	2.7	2.6
North Hampton	1,031	1,207	1,387	1.6%	1.4%	2.8	2.6
Area Total	**9,434**	**12,948**	**16,685**	*3.2%*	*2.6%*	2.8	**2.6**
Rock. County	**44,562**	**65,951**	**89,118**	*4.0%*	*3.1%*	2.9	**2.8**
New Hampshire	**246,789**	**323,493**	**411,186**	*2.7%*	*2.4%*	2.8	2.7

Source: 1970, 1980 and 1990 US Census

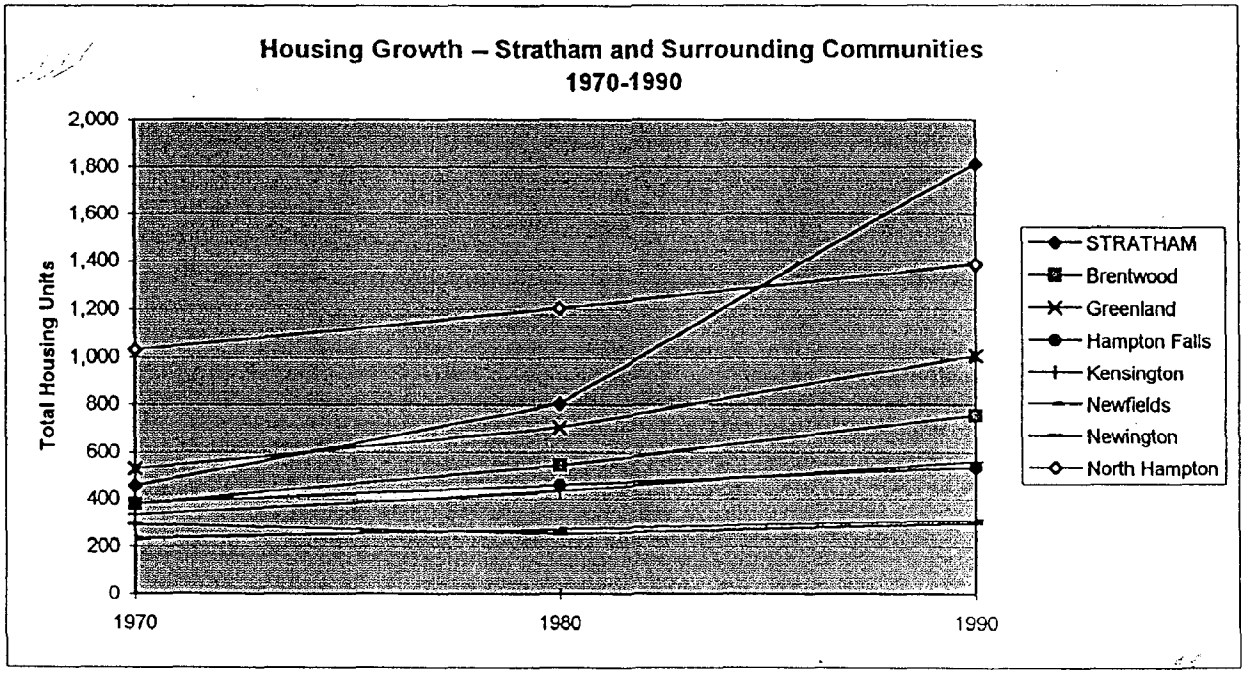
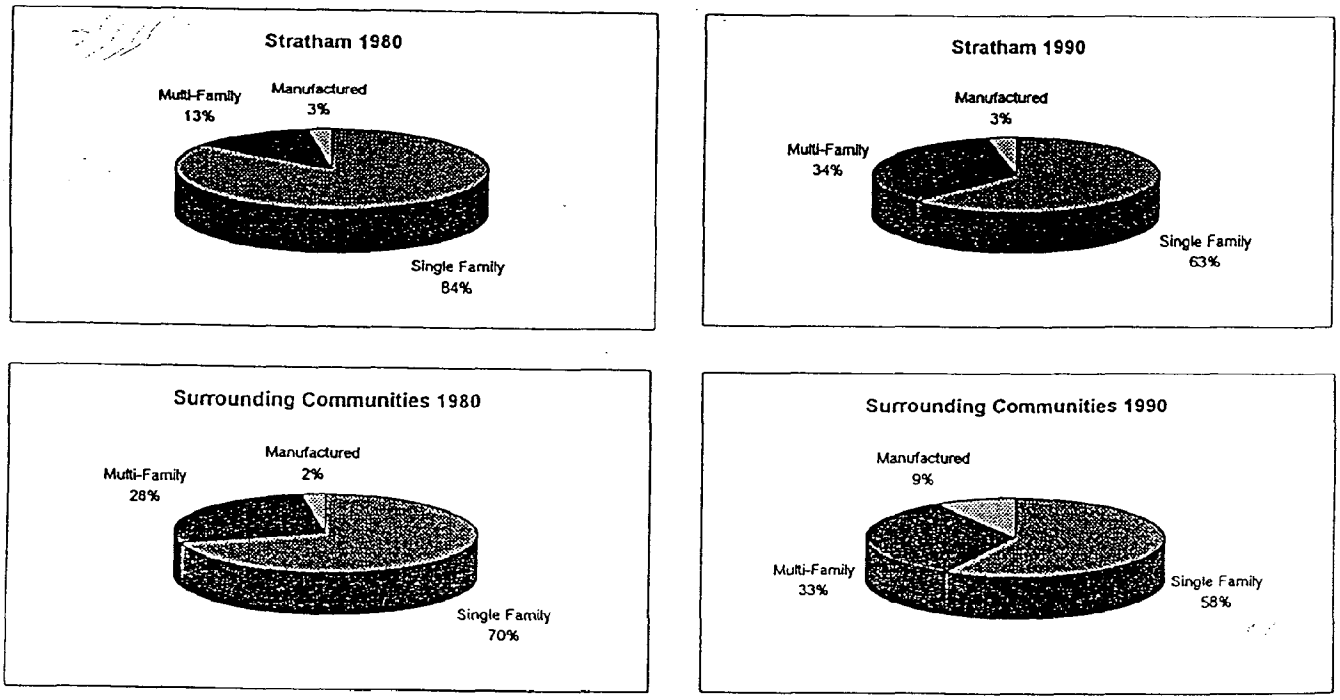


Table H-2
Housing Ownership, Vacancy and Tenure
1990 US Census

TOWN/AREA	All Housing Units	Owners vs. Rental Status -- all units					Vacancy Status	
		Owner		Renter		Total		
		No.	%	No.	%	Occupied	Vacant Units	%
STRATHAM	*1917*	*1,537*	*84.8%*	*275*	*15.2%*	*1,812*	105	5.5%
Brentwood	778	673	89.1%	82	10.9%	755	23	3.0%
Exeter	5346	3,385	68.0%	1,590	32.0%	4,975	371	6.9%
Greenland	1082	745	73.9%	265	26.3%	1,008	74	6.8%
Hampton	8599	3,146	62.3%	1,900	37.7%	5,046	3,553	41.3%
Hampton Falls	591	500	93.8%	33	6.2%	533	58	9.8%
Kensington	585	495	88.6%	64	11.4%	559	26	4.4%
Newfields	324	257	82.4%	55	17.6%	312	12	3.7%
Newington	320	205	68.8%	91	30.5%	298	22	6.9%
North Hampton	1495	1,197	86.3%	190	13.7%	1,387	108	7.2%
Area Total	21037	12,140	72.8%	4,545	27.2%	16,685	4,352	20.7%
Rock. County	101773	64,324	72.2%	24,794	27.8%	89,118	12,655	12.4%
New Hampshire	503904	280,372	68.2%	130,814	31.8%	411,186	92,718	18.4%

Figure H-1
Distribution of Housing Types, 1980 & 1990
Stratham and Surrounding Communities



Ownership and Occupancy

The proportion of renters versus owners among the occupied housing units is typical of communities of Stratham's size, though somewhat lower than the region's average. That average is pushed up by the larger communities which typically have a much higher percentage of rental units. The vacancy rate in 1990 was 5.5% -- considerably lower than the County average at the time of 12.4%. These figures were strongly affected by the 1989-92 recession that was currently in mid-course at that time. Stratham and nearby communities were less affected due to its higher proportion of owner-occupied units.

Housing Types

As evident in **Figure H-1** and **Table H-3,** Stratham has a comparatively diverse housing stock, which includes single family, duplex, multifamily and mobile home units. (NOTE: For the purposes of these tables, "single family" includes both single family and duplex structures; "multifamily" includes all residential structures with 3 or more housing units within them; manufactured housing includes any transportable stucture built on a permanent chassis and desing ed to be used as a dwelling with or without a foundation; it does not include prefabricated or "pre-site built" housing) A very large increase in multifamily units in Stratham occurred between 1980 and 1990. In that period multifamily housing grew from 109 units, representing 12.9% of the housing stock, to 659 units, representing nearly 35% of the total. Multifamily unit increases in surrounding communities was much more modest, growing from an average of 25.9% in 1980 to 32.9% in 1990. With only 65 mobile home units, Stratham has a strikingly low number of manufactured housing (i.e., mobile homes) - much less than the County average and than most of the surrounding communities. Since 1990, the growth in multifamily and manufactured housing units has declined, with single family units becoming the predominant housing type for new construction.

Housing Cost

The available Census data for housing cost suggests that rents and home prices in Stratham are slightly higher to those of the surrounding area. According to the 1990 Census, the median rent paid for housing in Stratham in 1990 was $661. -- approximately $120 more than the average rent paid for the surrounding communities and for all of Rockingham County (see **Table H-4**). The median value of homes reported by their owners in 1990 was $177,700. This is approximately 10% above that of the surrounding communities' average value of $165,727., but approximately 19% above the County median value of $149.800.

A second source of data regarding housing costs comes from the annual rent and purchase price surveys conducted by the NH Housing Finance Authority (NHHFA). The most recent NHHFA survey year, 1992, shows the median purchase price for homes in Stratham to be $116,000., nearly 20% below the average price the surrounding communities of $129,720.(see **Table H-5**). The NHHFA surveys provide data for previous years as well. A comparison between 1990 and 1992 indicates that median home purchase prices in Stratham have declined 37.3% in that short period -- a rate of decline not unlike the rate of cost escalation seen in latter years of the 1980s. Similar declines are shown for the surrounding communities as well, although the County and Statewide averages show a much less precipitous drop. Based on the NHHFA surveys, it appears that current home purchase prices are now at comparable levels to what they were in the 1985-1986 time frame. NHHFA rent survey results are not reported on a town-specific basis, however, survey results for Rockingham County and for the Portsmouth/Dover/Rochester urbanized area are available from 1985 onward. The trend in rental costs does not show the same degree of rise and fall as exhibited by housing purchase prices. The average rent for a two bedroom unit in Rockingham County was $658 per month in 1986, peaked at $675 in 1989, and has slowly declined since then to $652 in 1992.

Table H-3
Housing Distribution by Type
1980 & 1990

TOWN/AREA	1980 Total	Single Family number	%	Multi-Family number	%	Manufactured number	%
STRATHAM	*844*	*713*	*84.5%*	*109*	*12.9%*	*22*	*2.6%*
Brentwood	598	478	79.9%	31	5.2%	89	14.9%
Exeter	4406	2355	53.4%	1314	29.8%	737	16.7%
Greenland	728	625	85.9%	103	14.1%	0	0.0%
Hampton	4437	2622	59.1%	1726	38.9%	89	2.0%
Hampton Falls	483	432	89.4%	47	9.7%	4	0.8%
Kensington	450	400	88.9%	26	5.8%	24	5.3%
Newfields	301	244	81.1%	54	17.9%	3	1.0%
Newington	257	171	66.5%	25	9.7%	61	23.7%
North Hampton	1255	988	78.7%	132	10.5%	135	10.8%
Area Total/Avg.	**13759**	**9028**	**65.6%**	**3567**	**25.9%**	**1164**	**8.5%**
Rock. County	**68132**	**45559**	**66.9%**	**17423**	**25.6%**	**5150**	**7.6%**
New Hampshire	**347758**	**218351**	**62.8%**	**108575**	**31.2%**	**20832**	**6.0%**

TOWN/AREA	1990 Total	Single Family number	%	Multi-Family number	%	Manufactured number	%
STRATHAM	*1917*	*1193*	*62.2%*	*659*	*34.4%*	*65*	*3.4%*
Brentwood	778	640	82.3%	46	5.9%	92	11.8%
Exeter	5346	2279	42.6%	1945	36.4%	1122	21.0%
Greenland	1082	792	73.2%	275	25.4%	15	1.4%
Hampton	8599	4437	51.6%	3736	43.4%	426	5.0%
Hampton Falls	591	539	91.2%	39	6.6%	13	2.2%
Kensington	585	511	87.4%	22	3.8%	52	8.9%
Newfields	324	260	80.2%	50	15.4%	14	4.3%
Newington	320	213	66.6%	51	15.9%	56	17.5%
North Hampton	1495	1106	74.0%	125	8.4%	264	17.7%
Area Total/Avg.	**19120**	**10777**	**56.4%**	**6289**	**32.9%**	**2054**	**10.7%**
Rock. County	**101773**	**61147**	**60.1%**	**31688**	**31.1%**	**8938**	**8.8%**
New Hampshire	**503541**	**297474**	**59.1%**	**164178**	**32.6%**	**41889**	**8.3%**

Source: "Current Estimates & Trends in New Hampshire's Housing Supply, 1980-1990. N.H. Office of State Planning, January 1992.

Table H-4
Housing Costs
Rental and Owner Occupied Housing Units

TOWN/AREA	Median Rent 1990	Percent of Rock. Co. Average	Median Value Owner Occup. Units - 1990	Percent of Rock. Co. Average
STRATHAM	*$661*	*122%*	*$177,700*	*119%*
Brentwood	$517	96%	$169,400	113%
Exeter	$539	100%	$154,000	103%
Greenland	$690	128%	$168,100	112%
Hampton	$540	100%	$162,500	108%
Hampton Falls	$583	108%	$221,200	148%
Kensington	$505	93%	$171,000	114%
Newfields	$517	96%	$142,800	95%
Newington	$539	100%	$197,300	132%
North Hampton	$547	101%	$187,400	125%
Area Total/Avg.	**$564**	**104%**	**$175,140**	**117%**
Rock. County	**$541**	**100%**	**$149,800**	**100%**
New Hampshire	**$479**	**89%**	**$129,400**	**86%**

Source: 1990 Census of Population and Housing, Summary Population and Housing Characteristics

Table H-5
Median Housing Purchase Prices -- 1990 and 1992
Exeter and Area Communities

Communities	1990 Sample Size*	1990 Median Price	1992 Sample Size*	1992 Median Price	Percent Change 1991-1992
STRATHAM	***37***	***$185,000***	***73***	***$116,000***	***-37.3%***
Brentwood	9	$125,048	11	$105,048	-16.0%
Exeter	21	$136,287	50	$109,189	-19.9%
Greenland	9	$193,000	17	$150,000	-22.3%
Hampton	26	$160,000	33	$131,302	-17.9%
Hampton Falls	11	$194,000	12	$191,150	-1.5%
Kensington	7	$128,900	11	$136,000	5.5%
Newfields	7	$158,000	4	$150,429	-4.8%
Newington	2	$530,240	3	$340,000	-35.9%
North Hampton	20	$194,350	31	$159,900	-17.7%
Area Total/Avg	149	$200,483	245	$158,902	-20.7%
Rockingham County	1,133	$119,048	1,095	$112,381	-5.6%
New Hampshire	3,956	$107,524	3,470	$99,048	-7.9%

Source: N.H. Housing Finance Authority.
Purchase Price Median, 4 Quarters 1991 and 1992.

*Sample sizes under 50 are not statistically reliable.

Income

Like housing mix and cost, measures of income can be important indicators of the openness of a community for providing housing opportunities to individuals and families with low and moderate incomes. In communities without lower cost housing opportunities, individuals and families with lower incomes are forced to seek housing in other locations. As a result, communities which afford little opportunity for affordable housing tend to have higher median incomes than those with a greater supply of affordable housing.

Data from the 1990 Census indicates that Stratham had a higher median family income than the average for surrounding towns and for the County. Median family income in Stratham for 1989 (the reporting income year) was $57,350 or 18% above the average median of $48,670. for the surrounding towns and 22% above the median or $46,942. for Rockingham County (see **Table H-6**). Per capita income figures for Stratham are comparatively higher with the Town ranked 7th in the County.

Measures of median income, while a useful indicators for comparison purposes, do not tell the whole story. In addition to overall income levels, it is important to understand how the total population of an area (i.e. Stratham and its eleven neighboring communities) is split among various income ranges. Such an analysis shows what proportion Stratham has for each income range compared to the other communities. An even percentage of the area's population across all ranges would indicate an evenly balanced distribution of income groups. **Table H-7**, however, shows clearly that Stratham has a larger fraction of its population share in the three upper-most income ranges than do most of the other communities.

4.0 Regional Housing Needs Assessment

In 1988 the N.H. Legislature amended RSA 36:47 to mandate that all regional planning commissions in New Hampshire prepare a regional housing needs assessment which "...shall include an assessment of the regional need for housing for persons and families of all levels of income" (RSA 36:47,II). The stated purpose of the law is to assist municipalities in complying with RSA 674:2 which requires communities to assess housing needs in their own master planning process. The regional housing needs assessment must be updated every 5-years.

In 1989, the Rockingham Planning Commission prepared a Regional Housing Needs Assessment as a component of its regional master plan. In September of 1993 the RPC released a draft update of the Needs Assessment which incorporated data from the 1990 Census regarding housing characteristics and income. For the purpose of assessing regional housing needs for use in the Stratham Master Plan, the 1993 update to the Regional Housing Needs Assessment has been used in place of the original report so that the most accurate and up-to-date data could be incorporated into this plan.

The RPC identifies as the purpose of their Needs Assessment to quantify the size and distribution of the need for affordable housing in the region, and to provide communities with the information needed for their own housing needs assessments. Although a fair share apportionment of affordable housing is included in the report, the report states that this result is intended to be used only as a general indicator of the distribution of housing need in the region, not as a prescription of units needed in any particular community.

The Regional Housing Needs Assessment develops a fair share apportionment method which attempts to fairly distribute the unmet need for affordable housing to all communities in the region. The method involves distributing the identified need according to five factors relating to fair share. A numerical assessment is determined for each and is averaged for

Table H-6
Median Family and Per Capita Income
1979 & 1989 - Rockingham County

TOWN/CITY	- 1979 - Median Family Income	- 1979 - Per Capita Income	- 1989 - Median Family Income	- 1989 - Per Capita Income	Percent of Rock. Co. Avg. Per Capita 1989	Per Capita Income Rank Rock. Co. 1989
STRATHAM	*$23,664*	*$8,272*	*$57,350*	*$23,104*	*131%*	*7*
Brentwood	$20,635	$6,101	$47,222	$16,112	91%	24
Exeter	$19,481	$7,392	$42,556	$18,531	105%	11
Greenland	$23,973	$7,588	$48,467	$19,637	111%	9
Hampton	$21,547	$8,299	$45,447	$18,371	104%	13
Hampton Falls	$25,474	$9,516	$58,814	$23,736	134%	4
Kensington	$21,215	$8,216	$47,083	$17,645	100%	17
Newfields	$21,354	$7,381	$44,659	$15,821	89%	26
Newington	$17,407	$7,392	$45,625	$17,954	101%	15
North Hampton	$22,705	$9,433	$53,873	$23,672	134%	5
Area Total/Avg.	**$21,746**	**$7,959**	**$49,110**	**$19,458**	110%	--
Rock. County	**$21,181**	**$7,445**	**$46,942**	**$17,694**	100%	--
New Hampshire	**$19,724**	**$6,966**	**$41,628**	**$15,959**	90%	--

Source: 1990 US Census, STF 3A

Table H-7
Percent of Households By Income
1990 Census

TOWN/AREA	Percent of Area Population	Income Ranges $0 to $14,999	$15,000 to $29,999	$30,000 to $49,999	$50,000 to $74,999	$75,000 to $99,999	$100,000 and over
STRATHAM	*11%*	*5%*	*8%*	*11%*	*12%*	*19%*	*16%*
Brentwood	6%	4%	1%	5%	5%	5%	5%
Exeter	29%	38%	34%	32%	25%	20%	25%
Greenland	6%	6%	6%	6%	9%	7%	3%
Hampton	28%	35%	33%	29%	27%	31%	24%
Hampton Falls	3%	2%	3%	2%	4%	5%	7%
Kensington	4%	2%	4%	3%	4%	4%	3%
Newfields	2%	1%	2%	2%	2%	1%	1%
Newington	2%	1%	2%	2%	2%	1%	1%
North Hampton	8%	6%	7%	8%	11%	7%	13%
TOTAL	100%	100%	100%	100%	100%	100%	100%

Source: 1990 U.S. Census, STF3A - Tables P80, P107, and P110.

the purpose of distributing the housing need.

The five factors used and their rational is as follows:

FACTOR	RATIONALE
Employment in community	Jobs create demand for housing
Equalized assessed value	Related to town's ability to absorb low valued housing without undue impact on tax rate
Vacant Developable Land	Related to ability to develop new housing
Income	Related to existing balance or imbalance of income groups
Housing Units	Larger communities can absorb larger numbers of new units

The following steps are involved in developing the regional housing needs assessment:

1. Quantify need for affordable housing: called "indigenous" housing need; this is defined as the number of renter households among less than 80% of the region's median income and spending more than 30% of gross income on rent.

2. Identify "Excess Need": excess need occurs when the number of units identified for a specific community as indigenous need (in step one), exceeds the community's proportionate share of that need based on existing housing units.

3. Distribute "Excess Need": based on a numerical composite of the five factors described above, the excess need is redistributed to the region's communities. This result, combined with indigenous need is the fair share distribution.

4. Adjust for Housing Credits: the final step is to subtract "credits" from the fair share allocation for those communities in which affordable housing units have been added since the Census year (1990). Credits include mobile home building permits, units rehabilitated for rent assisted housing and units rehabed under the CDBG program.

The results of the fair share apportionment, which are shown in **Table H-8**, shows that Stratham has a lower percentage of "fair share" need compared to the regional average -- 6.0% for Stratham compared to 8.8% for the region.

This result is consistent with the housing demographics presented in Section 4 above which, taken together, indicate that Stratham has provided a greater diversity of housing opportunity than many of the surrounding communities. This conclusion does not mean, however, that there is no need for additional affordable housing in Stratham. As indicated in the Regional Housing Needs Assessment, in 1990 there were approximately 70 low and moderate income households in Stratham that were unable to find housing that was affordable to them (called the "indigenous housing need").

Some of the obstacles effecting the availability of affordable housing base lessened due to the large downward shift in

Table H-8
1993 Fair Share Housing Needs Apportionment
Prepared by the Rockingham Planning Comission per RSA 36:47

COMMUNITY	Indigenous Housing Need	Year Round Occupied Dwelling Units	Housing Need If Equal Distri-Bution	Excess Need	Fair Share Factor Average**	Excess Units Allo-Cated	Fair Share	Credits	Total Fair Share	Fair Share as % of 1990 Housing Units
Atkinson	62	1774	159	--	0.037	47	109	0	109	6.2%
Brentwood	28	755	68	--	0.032	40	68	1	67	8.9%
Danville	24	895	80	--	0.027	35	59	1	58	6.5%
E. Kingston	15	463	42	--	0.024	30	45	6	39	8.5%
Epping	114	1846	166	--	0.043	55	169	5	164	8.9%
Exeter	615	4975	447	168	--	0	447	0	447	9.0%
Fremont	36	865	78	--	0.031	40	76	4	72	8.3%
Greenland	85	1010	91	--	0.041	52	137	0	137	13.6%
Hampstead	107	2359	212	--	0.041	53	160	3	157	6.6%
Hampton	621	5046	453	168	--	0	453	0	453	9.0%
Hmpt. Falls	6	533	48	--	0.035	45	51	0	51	9.6%
Kensington	13	559	50	--	0.028	35	48	0	48	8.7%
Kingston	65	1911	172	--	0.042	54	119	1	118	6.2%
New Castle	25	345	31	--	0.031	40	65	0	65	18.8%
Newfields	11	312	28	--	0.028	36	47	0	47	15.2%
Newington	23	296	27	--	0.087	111	134	0	134	45.4%
Newton	81	1198	108	--	0.027	34	115	0	115	9.6%
No. Hampton	74	1387	125	--	0.041	52	126	0	126	9.1%
Plaistow	220	2601	234	--	0.052	66	286	0	286	11.0%
Portsmouth	1771	10329	928	843	--	0	928	52	876	8.5%
Rye	143	1905	171	--	0.041	53	196	0	196	10.3%
Salem	652	9185	825	--	0.157	201	853	0	853	9.3%
Sandown	60	1304	117	--	0.032	41	101	2	99	7.6%
Seabrook	355	2808	252	103	--	0	252	10	242	8.6%
So. Hampton	2	257	23	--	0.025	31	33	0	33	13.0%
STRATHAM	***70***	***1812***	***163***	***--***	***0.044***	***56***	***126***	***18***	***108***	***6.0%***
Windham	72	2830	254	--	0.057	73	145	0	145	5.1%
Total (Avg)	5350	59560	5350	1282	1.000	1282	5350	103	5247	8.8%

** The "fair share factor average" includes relative measures for five factors: employment, equalized assessed valuation, vacant developable land, median income, and total housing unitsvaluation

NOTE:

This Housing Need Apportionment is intended for use as part of an overall Regional Housing Needs Assessment as required by RSA 36:47. The Rockingham Planning Commission does not support the use of this table to identify specific housing unit needs units to individual communities due to the inherent imprecision of any such apportionment method. It should be used only as a general indicator of housing needs within the region and as a reference in the preparation of local housing needs analyses.

real estate values and mortgage rates, and modest decreases in rents from peak levels in the late 1980s. But the problem has not "gone away", because other obstacles, such as increased property tax burden for home owners and lost home equity have risen.

5.0 Analysis of Existing Zoning and Land Use Regulations

5.1 Zoning Districts

The Town's current zoning ordinance includes five of seven (non-overlay) zoning districts in which residential uses are permitted. Together they comprise the vast majority of the land area of the community. The only zones in which residential use is not permitted are the Office Research zone and Industrial zone which together total less than 10% of the total land area. The general residential provisions of the zones are as follows

- Residential -Agricultural (R/A): This is the basic underlying district in Stratham. The intent is to promote agricultural, low density residential and open space-conservation uses. Permitted residential uses permitted include single and duplex units on individual lots and single, duplex and multifamily (up to 4 units per building) units in residential cluster developments. Manufactured housing is permitted anywhere in the district, however, conventional mobile homes are not permitted.

- Manufactured/Mobile Homes (MAH): Located south of Portsmouth Avenue adjacent to the Greenland Town line, this district permits manufactured housing, including conventional mobile homes, on individual lots, conventional subdivisions or in cluster developments. The underlying uses permitted in the R/A district are permitted as well.

- Professional Residential (PRE): This zone extends along both side of Portsmouth Ave. from Bunker Hill to Mill Brook. It permits a mixture of residential and professional businesses. Single family and duplex units are permitted by right, cluster development is permitted by special exception and manufactured housing/mobile homes are not permitted.

- Town Center (TC): Located in the vicinity of the Stratham Circle, the zone permits the same residential uses as the PRE district and permits small scale commercial and institutional uses.

- General Commercial (GC): Located along Portsmouth Avenue from NH 101 to just south of Bunker Hill Ave., this zone limits residential use to duplex units which are permitted by special exception. It is primarily designed for larger scale highway commercial development dependent on high traffic volumes.

5.2 Development Density

Since 1983, Stratham has employed soil-based lot sizing to determine lot size for conventional development and unit density for cluster development. Soil-based lot sizing is the accepted standard in Rockingham County as the best method for determining the density of development in areas served by on-site septic systems. By tying development density to the soil's capacity to assimilate waste effluent, soil-based lot sizing is less arbitrary than conventional lot zoning. Its use ensures that groundwater will not be degraded by the recharge from septic systems.

5.3 Cluster Development

Stratham allows and encourages cluster development as an alternative to standard residential subdivision practice.

Cluster Development allows for the placement of buildings, roads and septic systems where they are best suited to the land and is commonly considered as a good zoning strategy for promoting affordable housing. By making best use of the land, limiting the linear extent of roads and utilities, and allowing for common water and septic systems, cluster development housing can be made more affordable than conventional development. It also can help protect large useable areas of open space in exchange for higher lot densities. The actual implementation of cluster development has not always met these objectives and has sometimes lead to higher densities and less useable open space than intended. The Cluster provisions of the ordinance are in need of review to increase the planning board's discretion in approving cluster development design and limiting the amount of wetland areas that can be calculated in the density determination

5.4 Accessory Apartments

In 1990, the Town amended the zoning ordinance to permit accessory apartments, for the purpose as stated in the ordinance is "to provide a housing alternative for family member in a personal hardship situation, while maintaining neighborhood aesthetics..." Allowing accessory apartments is another important zoning measure which has the affect of increasing the supply of affordable housing Stratham's ordinance is somewhat limited in this respect in that it limits occupant of accessory apartments to family members.

5.5 Evaluation

As highlighted in the number of residential zones included in current zoning, Stratham permits a good diversity of housing types through its land use and zoning regulations. Considered as a whole, the ordinance provides a relatively high degree of flexibility for residential development -- especially compared to surrounding communities of similar side and development stage.

In evaluating the adequacy of zoning to accommodate housing need, two specific issues need to be examined: the degree to which the remaining land available for residential use is sufficient to accommodate additional growth, and second, technical compliance with New Hampshire manufactured statute (RSA 674:72)

While no specific buildout analysis has been undertaken, it is evident that, given the flexibility inherent in Stratham's zoning ordinance, sufficient residentially zoned land exists to meet the need for additional residential development. Regarding manufactured housing, the statute requires that the Town "afford reasonable opportunities for the siting of manufactured housing" and that the majority of the residentially zoned land in the town permit such housing either on individually owned lots or in manufactured housing subdivisions. The combination of uses permitted in the R/A and MAH zones appear to meet this standard.

Regarding affordible housing, it is important that Stratham provide reasonable and practical opportunities for low/moderate income persons to obtain affordable housing. While it is not necessary nor expected that the Town will take steps to actually "provide" such housing, it is important that a realistic opportunity exist for private individuals and developers to fill the need for lower cost housing. The Town effects this though its development regulations and policies. In some communities, these policies and regulations are made unnecessarily restrictive in an attempt to discourage growth and the development of lower cost housing. While this is true in some cases, it must also be acknowledged that communities have an obligation to ensure that development standards are adequate to protect public health, safety and the environment and to protect against future public expenditures to correct for faulty design or construction. These standards inevitably, but necessisarily, raise the cost of building houses. A reasonable test for the fairness of Stratham's Zoning land use regulations is that, when taken together, they do not place such stringent conditions on development so as to effectively discourage or preclude the development of lower cost housing.

Given the flexibility for residential development, including allowances for cluster development, including multifamily housing, manufactured housing subdivisions, manufactured housing on individual lots in most residential districts, duplexes, accessory apartments and soil-type lot sizing, the Town easily meets this test. That being said, there are several areas where the Town can make modest adjustment to existing development policies to promote the development of a more balanced housing supply.

Stratham already has many of the regulatory policies in place that are commonly recommended to promote a balanced housing supply. These include allowances for cluster development , multifamily housing, accessory apartments, and soil based lot sizing. Other techniques including incentive zoning, inclusionary zoning, modified development standards, and others are discussed in detail in the 1994 RPC *Regional Housing Needs Assessment.*

6.0 Recommendations

The 1985 Master Plan contained a number of policies and recommendations which the present Master Plan Committee believes remain, in whole or in part, valid. These are included below. In most cases they have modified somewhat to reflect current needs.

1. As an overall goal the Town of Stratham should encourage a housing pattern that preserves and protects the Town's rural characteristics while providing diversified housing alternatives.

2. The Planning Board should undertake a review of current cluster development district regulations and propose changes, as needed. The following specific issues should be reviewed: the maximum density of development allowed under varying soil conditions; the quality and useability of open space for conservation and recreational uses; strenghten existing authority for the planning board to evaluate overall development design, (including use and location of open space; lot, building and road placement) by incorpaorating design guidelines into the Town's development regulations.

3. The Planning Board should encourage, as part of the review process, all large scale developments to dedicate land for open space.

4. The Planning Board should investigate and consider implementing innovative zoning and land use regulations, including the development of affordable housing in new residential developments to help maintain a balanced housing supply.

5. The Planning Board should consider proposing an overlay zone for elderly housing which would include provisions designed to encourage the development of such housing, including a larger limit in units per building, collocation of limited health care facilities, and others as needed.

6. The Planning Board should review the existing Mobile Home District (MAH) and consider and recommend alternatives, including expanding or establishing additional districts, to assure that the opportunity for manufactured housing continues in Stratham. The review should specifically examine the remaining development potential within the existing MAH district.

7. The Planning Board should encourage the provision of useable open space in all residential developments

8. The Planning Board should include sufficient rights of way in residential subdivisions to allow for the

construction of future utilities, sidewalks and bicycle paths. Where appropriate to the location, size and expected residential population, sidewalks and bicycle paths should be included in residential development designs.

In addition to the above the following new recommendations are made:

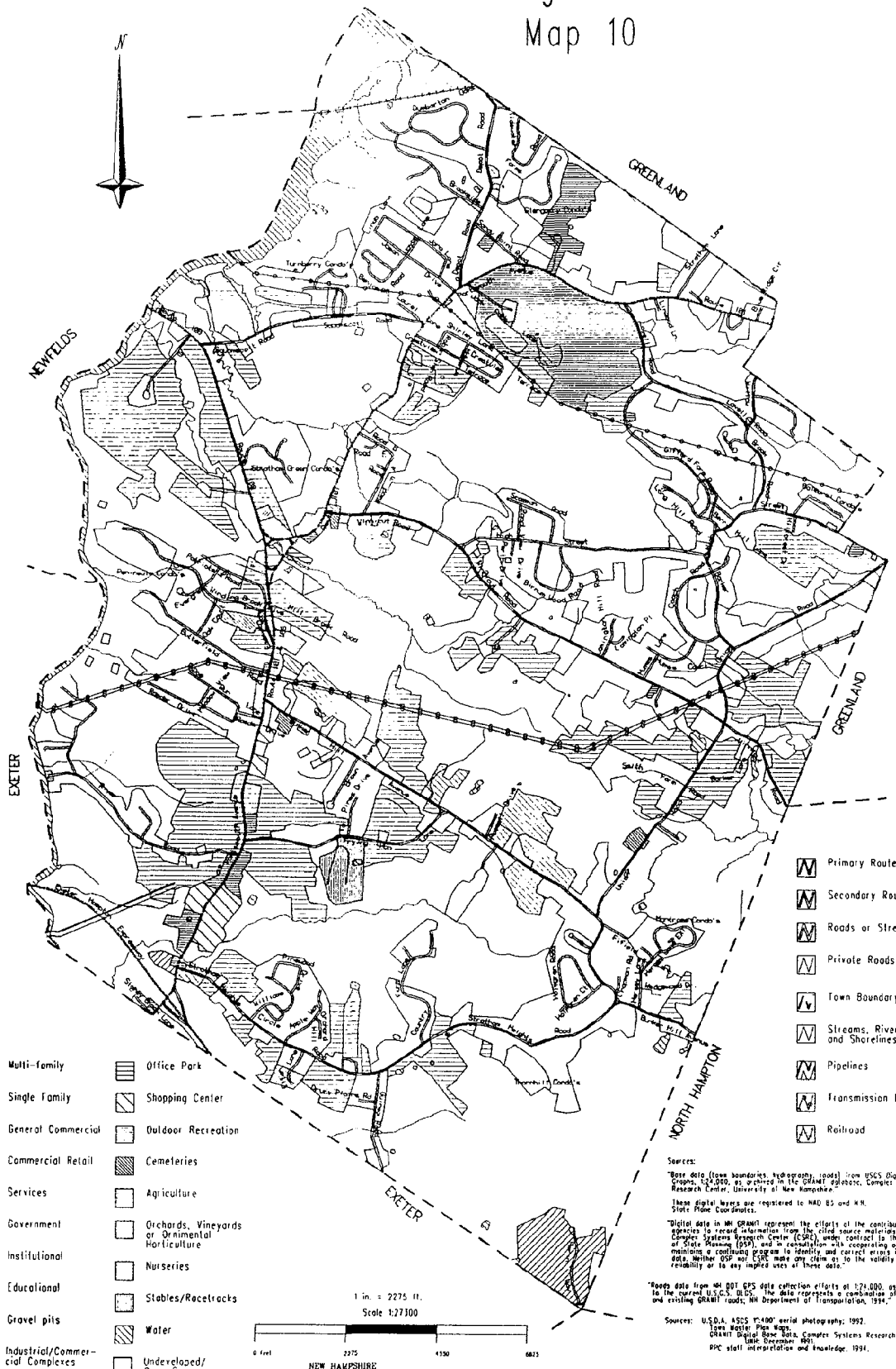
9. In an effort to encourage the use of single family cluster development, the Town should reduce the minimum size of development required to utilize the cluster provisions for single family unit development from 30 acres to between 10 and 20 acres.

10. The Town should revise the current accessory apartment provisions in the zoning ordinance to remove or modify stipulations which tend to discourage its use.

STRATHAM MASTER PLAN

5. EXISTING LAND USE -- GIS MAPS

Stratham, N.H.
Existing Land Use
Map 10



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire.

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability of or to any implied uses of these data."

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

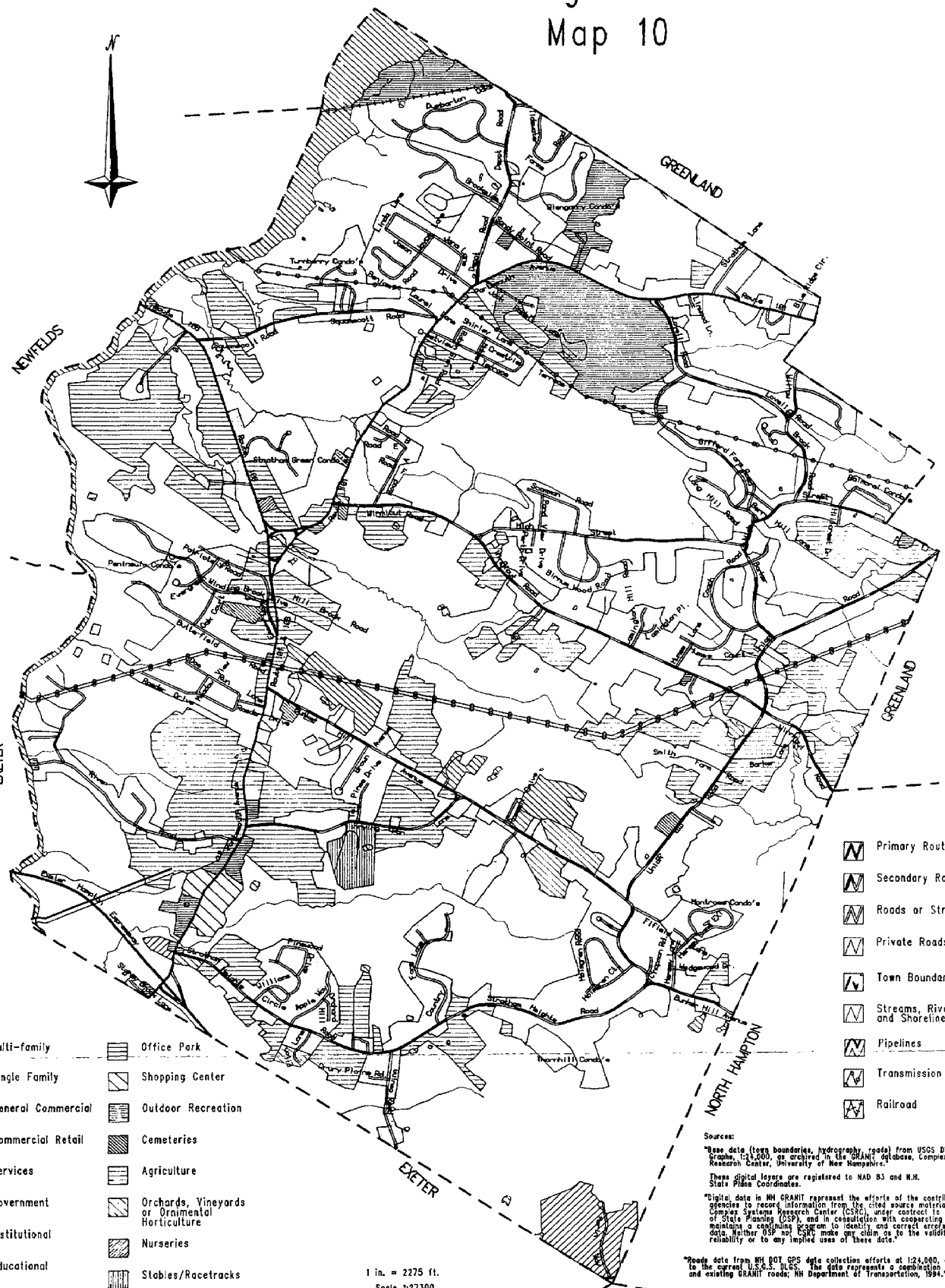
Sources: U.S.D.A. ASCS "1:40D" aerial photography; 1992.
Town Master Plan Maps.
GRANIT Digital Base Data, Complex Systems Research Center, Date: December, 1991.
RPC staff interpretation and knowledge, 1994.

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0570.

Prepared by the
Rockingham Planning Commission
August 15, 1996
DRA

Stratham, N.H.
Existing Land Use
Map 10



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

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Sources: U.S.D.A. ASCS 1":400' aerial photography; 1992.
Town Master Plan Maps.
GRANIT Digital Base Data, Complex Systems Research Center, UNH; December 1991.
RPC staff interpretation and knowledge; 1994.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57DZ0320.

Prepared by the Rockingham Planning Commission
August 15, 1996
DRA

STRATHAM MASTER PLAN

6. MASTER PLAN COMMITTEE SUPPORT DOCUMENTATION

Meeting Agendas - April to October 1996

Master Plan Update Schedule

TOWN OF STRATHAM
Incorporated 1716
NEW HAMPSHIRE
10 Bunker Hill Avenue • Stratham, N.H. 03885
(603) 772-4741

MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, April 24, 1996
Stratham Municipal Center
7:30 PM

I. Introductions

II. Outcome of Stewardship Process; Status of Final Report

III. Review/discussion/further comments on of Master Plan draft sections* completed to date
* *(Introduction, Construction Materials, Transportation, Utilities, Community Facilities, Recreation, Conservation/Preservation, Housing);*

IV. Integrating Stewardship findings/recommendations with Master Plan sections

V. Proposed Timeline for Completion of Master Plan Update (Attached)

VI. Next meetings: subcommittees and full committee

VII. Other business/adjourn.

cc: Joe Derwiecki, Planning Board Chair
Paul Deschaine, Town Administrator
Clay Mitchell, RPC Circuit Rider

TOWN OF STRATHAM
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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, May 29, 1996
Stratham Municipal Center
7:30 PM

I. Review of Draft Stewardship Report; provide comments to Steve Wallace
NOTE: Draft Copies of the Stewardship Report are available for review at the Town Office and Library. Please review it the meeting and note any comments you have.

II. Subcommittee Reports - Status of Draft Sections
   a. Conservation / Preservation
   b. Recreation (Revised Section)
   c. Transportation

III. Establish Phase II Subcommittees: Community Facilities; Housing; Land Use(?)

IV. Review Draft Existing Land Use Map (Attached)
(a large version will be available at the meeting to mark up)

V. Brainstorming Session: Future Land Use Section -- Content and Map

VI. Review Revised Timeline (Attached)

VII. Next meetings: subcommittees and full committee

VIII. Other business/adjourn.

cc: Joe Derwiecki, Planning Board Chair
Paul Deschaine, Town Administrator
Clay Mitchell, RPC Circuit Rider

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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, June 26, 1996
Stratham Municipal Center
7:30 PM

I. Subcommittee Reports - Status of Draft Sections
   a. Conservation / Preservation (revised draft to be distributed)
   b. Recreation
   c. Trasnportation
   d. Housing (need to reschedule meeting)

II. Complete Review of Draft Existing Land Use Map
(a large color version is available for review & mark-up at the Town office

III. Brainstorming Session: Future Land Use Section -- Content and Map
(tabled from last meeting)

IV. Review of Timeline

V. Next meetings: subcommittees and full committee

VI. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Clay Mitchell, RPC Circuit Rider

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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

*****Thursday, August 15, 1996*****
Stratham Municipal Center
7:30 PM

I. Approval of Minutes from June 26, 1996 Meeting

II. Review/Discuss/Approve Final Draft of Recreation Chapter (Attached)

III. Resources/Conservation/Preservation Chapter
  a. Review & Discuss new Draft (Attached)
  b. Distribution/Discussion of Draaft Recommendations

IV. Subcommittee Reports - Status of Draft Sections
  a. Trasnportation
  b. Housing

V. Review of Revised Draft -- Existing Land Use Map

VI. Review of Timeline

VII. Next meetings: subcommittees and full committee

VIII. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Clay Mitchell, RPC Circuit Rider

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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, August 28, 1996
Stratham Municipal Center
7:30 PM

I. Distribution of Minutes from August 14, 1996 Meeting

II. Review/Discuss Draft of Housing Chapter (Distributed on the 14th)

III. Resources/Conservation/Preservation Chapter
   a. Discussion of prior plan recommendations (distributed on the 14th)
   b. Distribution of Draft Recommendations

IV. Transportation Subcommittee: meeting dates and schedule for preparing Draft

V. Final Revisions to Existing Land Use Map -- to be provided by the Committee

VI. Distribution/review of revised base map (showing new roads, gas line)

VII. Schedule
   a. Meetings in September
   b. Final drafts for Resource/Cons/Pres and Housing
   c. Second drafts for Transportation, Comm. Facilities, Utilities, Land Use
   d. RPC Coastal Program submittals for Oct. 1

VIII. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Clay Mitchell, RPC Circuit Rider

TOWN OF STRATHAM
NEW HAMPSHIRE
10 Bunker Hill Avenue - Stratham, N.H. 03885
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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, Septmber 25, 1996
Stratham Municipal Center
7:30 PM

I. Approval of Minutes from August 28, 1996 Meeting **(Attached)**

Old Business:

II. Final discussion/ approval of Draft of Housing Chapter (Distributed on the 14th)

III. Resources/Conservation/Preservation Chapter--
-- finish Discussion of Draft Recommendations (distributed Aug. 28th)

New Business

IV. Discussion of new Draft Transportation Chapter **(Attached)**

V. Review/Discussion of "Stratham Tax Base Analysis" (for Land Use Chapter) **(Attached)**

VI. Schedule
a. Meetings in October
b. Final draft for Transportation
c. New drafts for Comm. Facilities, Utilities, Land Use
d. RPC Coastal Program submittals for Oct. 11

VIII. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Joe Derwiecki, RPC Commissoner
Clay Mitchell, RPC Circuit Rider

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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, Septmber 30, 1996
Stratham Municipal Center
7:30 PM

I. Approval of Minutes from September 25, 1996 Meeting **(to be distributed)**

Old Business:

II. Resources/Conservation/Preservation Chapter--
-- finish Discussion of Draft Recommendations (copy attached for those not attending Aug. 28th meeting)

III. Draft Transportation Chapter, (including Recommendations) --
-- Conclude Discussio(copy attached for those not attending 9-25-96 meeting)

New Business

IV. Review/Discussion of "Stratham Tax Base Analysis" (for Land Use Chapter)

V. Schedule
a. Meetings in October: **Monday, October 7th,** and ??
b. Final draft for Transportation
c. New drafts for Land Use, Comm. Facilities, Utilities
d. RPC Coastal Program submittals for Oct. 11

VIII. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Joe Derwiecki, RPC Commissoner
Clay Mitchell, RPC Circuit Rider

TOWN OF STRATHAM
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MEETING NOTICE AND AGENDA

STRATHAM MASTER PLAN COMMITTEE

Wednesday, October 7, 1996
Stratham Municipal Center
7:30 PM

I. Distribution/approval of Minutes from September 30, 1996 Meeting **(if available)**

II. Land Use Chapter

A. Review of Proposed Chapter Content **(see outline attached)**

B. Distribution/Review of Existing Land Use section

C. Review/Discussion of "Stratham Tax Base Analysis" **(distributed in mailing for 9/30 meeting)**

D. Future Land Use "Brainstorming"

III. Discussion of revised Community Facilities Chapter **(Attached)**

IV Assembling graphics for Master Plan Document (photographs, drawings, etc.)

IV. Schedule
- a. Meetings in October
- b. Final Drafts for Land Use and Comm Facilities
- c. New drafts for Utilities, Comm. Facilities, Utilities, Land Use
- d. RPC Coastal Program submittals for Oct. 11

V. Other business/adjourn.

cc: Bill Krooss, Planning Board Chair
Paul Deschaine, Town Administrator
Joe Derwiecki, RPC Commissoner
Clay Mitchell, RPC Circuit Rider

PROPOSED TIMELINE FOR COMPLETION OF STRATHAM MASTER PLAN

UPDATED: May 21, 1996

Task	Responsible Party	Integrate Stewardship Recomm.	Timeframe May	Jun	Jul	Aug	Sep	Oct	Nov
Community Facilities Section									
Committee finalizes comments	Subcomm.	X							
Final Draft	RPC								
Committee Approval	Full Comm.								
Recreation									
Committee finalizes comments	Subcomm.								
Final Draft	RPC								
Committee Approval	Full Comm.								
Conservation & Preservation									
Committee finalizes comments	Subcomm.	X							
Final Draft	RPC								
Committee Approval	Full Comm.								
Transportation									
Committee finalizes comments	Subcomm.	X							
Final Draft	RPC								
Committee Approval	Full Comm.								
Utilities									
Committee finalizes comments	Full Comm.	X							
Final Draft	RPC								
Committee Approval	Full Comm.								
Housing Chapter									
Complete Draft	RPC								
Committee Review	Subcomm??								
Final Draft	RPC								
Committee approval	Full Comm.								
Community Profile (Population Chapter)									
Prepare Draft	RPC								
Committee Review	Full Comm.								
Final Draft	RPC								
Committee approval	Full Comm.								
Existing Land Use									
Prepare Draft Map	RPC								
Committee Review /Correct Draft Map	Full Comm								
Prepare Draft Text	RPC								
Committee Review Text	Full Comm								
Final Draft	RPC								
Committee approval	Full Comm.								
Future Land Use									
Discuss/brainstorm content & map	RPC/Full Comm.	X							
Prepare Draft text and map	RPC								
Committee Review	Full Comm.								
Prepare Final Draft	RPC								
Committee approval	Full Comm								
Goals/Recommendations									
Review Goals/Reccs from Sections	RPC/Full Comm.	X							
Prepare Draft	RPC								
Committee Review	Full Comm.								
Prepare Final Draft	RPC								
Committee approval	Full Comm								
Final Document									
Discuss format	RPC/Full Comm.								
Obtain photographs/graphics	RPC/Full Comm.								
Finalize all document maps	RPC/Full Comm.								
Prepare camera-ready copy	RPC								
Produce review copies; CZP submittal	RPC								
Produce Adopted Copies	Town								
Meetings									
Full MP Committee									
MP Subcommittees (TBD on 4/24)			?	?	?	?	?		
Presentation to Planning Board									
Planning Board Worksession (?)									
Planning Board Public Hearing									
RECUPERATE!!									